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ALTRON INDUSTRIES, INC.

OPERATION AND MAINTENANCE INSTRUCTIONS
WITH PARTS LIST
FOR

ANTENNA COUPLERS
MC1008 AND MC1009

(CU1382F/FRR) (CU1382G/FRR)

ALSO WILTEK 308

COMMUNICATIONS & ELECTRONICS
DIVISION
GAITHERSBURG, MARYLAND

TECHNICAL MANUAL

OPERATION AND MAINTENANCE INSTRUCTIONS WITH PARTS LIST FOR ANTENNA COUPLERS MCI008 AND MCI009

(CUI382F/FRR) (CUI382G/FRR)

ALSO WILTEK 308

NOTE: ANTENNA COUPLERS MCI008 AND MCI009 ARE COMMERCIAL IDENTIFICATION FOR THE CUI382F/FRR AND CUI382G/FRR. TEXT REFERENCES TO EITHER THE CUI382F/FRR OR CUI382G/FRR ARE IDENTICAL FOR THE MCI008 AND MCI009 RESPECTIVELY.

Aiken Industries
Communications
& Electronics Division
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GAITHERSBURG, MARYLAND 20760

AUGUST 1977

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RECORD OF CHANGES

CHANGE NO.	DATE	TITLE OR BRIEF DESCRIPTION	ENTERED BY

VALIDATION PERFORMANCE

Technical Manual, Operation and
Maintenance Instructions with Parts List,
Antenna Couplers CU-1382F/FRR
and CU-1382G/FRR

Contractor:

Aiken Electronics/Aero Geo Astro
Division of Aiken Industries
College Park, Maryland 20740

Sub-Contractor (if performing validation):

Contract No(s) and Purchase Orders, if applicable

Chapter	Section	Paragraph	Date Validation Completed	Check here if not validated
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2	-	-		
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4	-	-		
5	-	-		
6	I	-		
6	II	-		
7	-	-		
8	-	-		

Name & Authority of Validating Officer:

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Figure 1-1. Antenna Couplers CU-1382F/FRR and CU-1382G/FRR

CHAPTER 1

GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This Technical Manual describes Antenna Couplers CU-1382F/FRR and CU-1382G/FRR (hereafter also referred to as the CU-1382F/FRR or CU-1382G/FRR or antenna couplers when discussion pertains to both), and includes operation; functional description; scheduled maintenance; troubleshooting; corrective maintenance; and installation procedures; and a parts list for these units. The antenna couplers are shown in Figure 1-1.

1-3. FUNCTIONAL DESCRIPTION.

1-4. The antenna couplers are designed for shore communication use and are broadband, wide range, solid state devices. These antenna couplers provide eight receiver inputs from one antenna. The receivers operate independently without adjustment to the antenna coupler. The operating frequency range of the antenna couplers is 2 to 32 MHz. The antenna couplers are physically and electrically similar. The discussions within this manual will relate to both type of antenna couplers unless otherwise noted.

1-5. PHYSICAL CHARACTERISTICS. The antenna couplers are housed in an aluminum chassis, with radio frequency interference shielding. The front panel is designed for a 19-inch rack and provides for relay rack mounting. The operating control and indicators are located on the front panel and all power and signal connections are made on the rear of the chassis. The three modules are interconnected by cable assemblies for ease of maintenance.

1-6. ELECTRICAL CHARACTERISTICS. The antenna coupler provides eight isolated but identical rf signal outputs from one input signal. Each output signal has a nominal insertion gain of 2 ± 1 dB. The antenna coupler also has provisions for attenuation of undesired signals from both out-of-band input and ac line sources. The CU-1382G/FRR has a phase tracking capability. Except for the ac input circuit, all components are mounted on replaceable modules.

1-7. REFERENCE DESIGNATIONS. Reference designations and the function of the electronic assemblies of the antenna couplers are listed in table 1-1. Figure 1-2 shows the location of the electronic assemblies.

1-8. REFERENCE DATA.

1-9. Antenna couplers, CU-1382F/FRR and CU-1382G/FRR manufactured by Aiken Electronics/Aero Geo Astro (part numbers 34-120-1 and 34-120-2), operate from 105 to 250 VAC, single phase, 50 to 60 Hz. Table 1-2 lists a summary of the electrical characteristics of the antenna couplers.

1-10. EQUIPMENT SUPPLIED.

1-11. Equipment supplied with the antenna coupler is listed in table 1-3.

1-12. EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED.

1-13. Test equipment and publications required but not supplied with the antenna coupler are listed in table 1-4.

1-14. FACTORY AND FIELD CHANGES.

1-15. Factory and Field changes made to the antenna couplers CU-1382F/FRR and CU-1382G/FRR are listed in tables 1-5 and 1-6.

Table 1-1. Antenna Coupler, Assemblies and Reference Designations

REFERENCE DESIGNATION	ASSEMBLY/SUBASSEMBLY NAME	FUNCTION
A1	RF Filter	Filters frequency bands below 1.6 MHz and 40 MHz above extending to 150 MHz.
A2	Divider Assembly	Divides one input antenna signal into 8 receiver signals.
A3	Power Supply Assembly	Converts input ac power to a regulated +23.5 vdc.
A3A1	Regulator Assembly	Provides voltage regulation for +23.5 vdc supply.

Table 1-2. Antenna Couplers, Functional Characteristics

Frequency Range		2 to 32 MHz with rf Filter
Input Impedance		50 ohms, nominal, unbalanced
Input VSWR		No greater than 1.5:1
Insertion Gain		2 ± 1 dB for most units, (3 ± 2 dB per specification
Gain Tracking (CU-1382G/FRR)		±0.5 dB
Phase Tracking (CU-1382G/FRR)		±2° maximum (phase standard)
RF Filter Attenuation (CU-1382F/FRR)	nominal	-50 dB, 14 KHz to 1.6 MHz -35 dB, 40 MHz to 80 MHz -40 dB, 80 MHz to 150 MHz See figure 3-2

Table 1-2. Antenna Couplers, Functional Characteristics (Cont)

RF Filter Attenuation (CU-1382G/FRR)	nominal	-28 dB, 14 KHz to 1.6 MHz -30 dB, 40 MHz to 150 MHz See figure 3-2
RF Signal Overload Protection		Greater than 10 volts rms (2-32 MHz)
Intermodulation Products	2 to 32 MHz:	Better than -65 dB below two 0.5 volts rms input signals
	32 to 60 MHz:	Better than -55 dB below two 0.5 volt rms input signals
Noise Figure		7.0 dB nominal 8.4 dB maximum
MTBF		30,000 hours
Ambient Temperature Limitations	Operating:	40°C to +50°C (-40°F to 122°F)
	Nonoperating:	-62°C to +75°C (-80°F to 167°F)
Output Impedance		50 ohms nominal, unbalanced
Output VSWR		No greater than 1.5:1
Output-to-Input Isolation		50 dB minimum
Output-to-Output Isolation		Greater than 40 dB

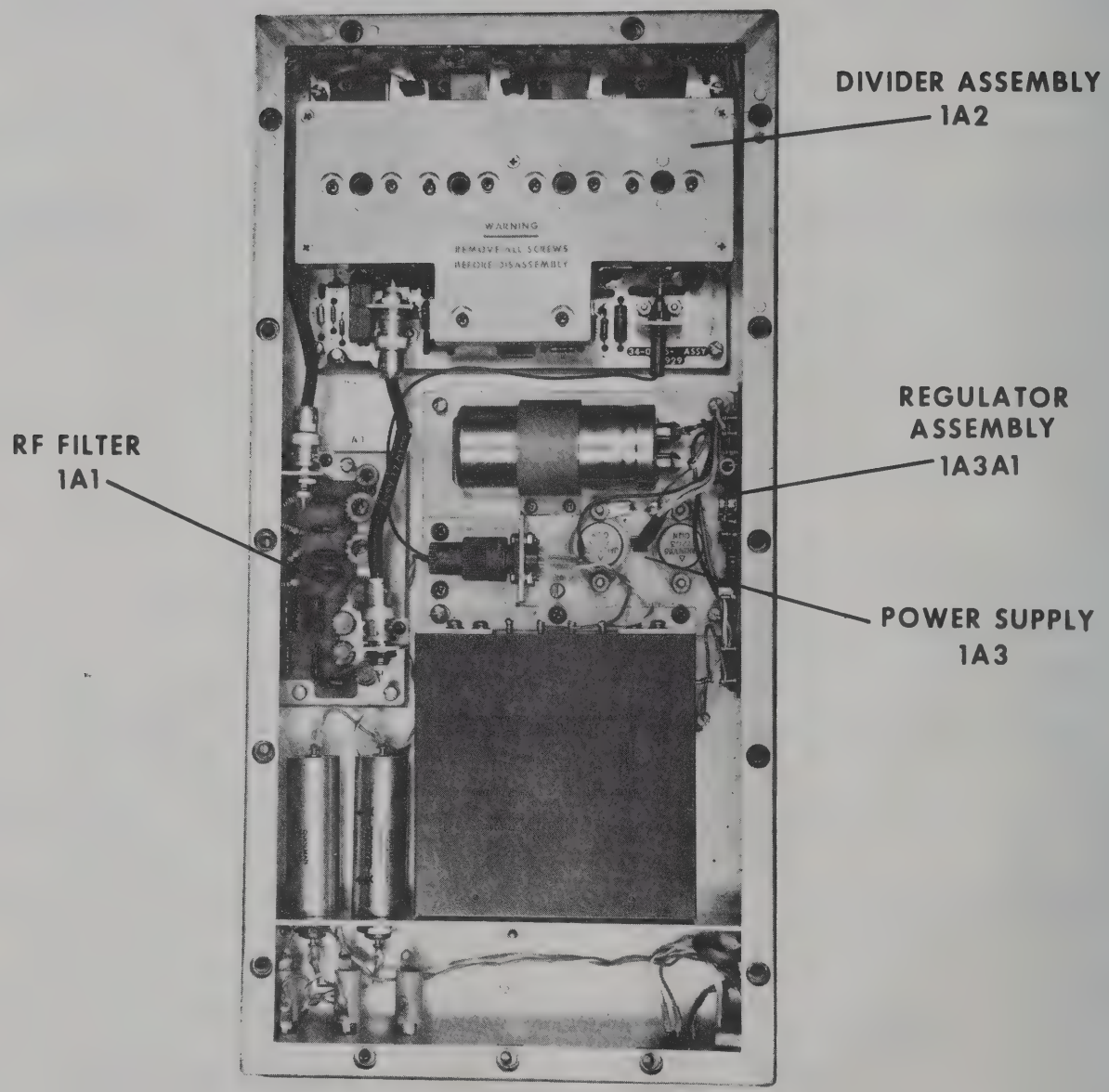


Figure 1-2. Antenna Coupler, Top View, Cover Removed

Table 1-3. Antenna Coupler, Equipment Supplied

QTY PER EQPT	NOMENCLATURE		UNIT NO.	HEIGHT	OVERALL DIMENSIONS (IN.) (LESS CONNECTORS)		VOLUME (FT^3)	WEIGHT (LB)
	NAME	DESIGNATION			WIDTH	DEPTH		
1	Antenna Coupler	CU-1382F/FRR	1	1.72	8.5	18.0	1.83	11.37*
		or						
		CU-1382G/FRR	1	1.72	8.5	18.0	1.83	11.37*
2	Technical Manual Operation and Maintenance Instruction with Parts List Antenna Couplers CU-1382F/FRR and CU-1382G/FRR	NAVELEX						

* With Front Panel

Table 1-4. Antenna Coupler, Equipment and Publications Required but Not Supplied

CATEGORY	RECOMMENDED EQUIPMENT	ALTERNATE	EQUIPMENT TEST PARAMETERS	APPLICATION
RF Signal Generator	CAQI-606-B (or equiv)		Output Impedance: 50 ohms Frequency range: 50 KHz to 65 MHz Output: 0 to 3 volts	Troubleshooting and maintenance procedures
Oscilloscope	AN/USM-281 (or equiv)		Frequency: Dc to 50 MHz Input impedance: X and Y axis: 1 megohm Input sensitivity: 5 mV/cm-10V/cm calibrated	Troubleshooting and maintencance procedures
Directional Bridge	Hewlett-Packard HP8721A (or equiv)		Coupling: 6 dB Frequency response: ±0.5 dB, 0.1 to 110 MHz	Troubleshooting and maintenance procedures
Multimeter	AN/USM-311 (or equiv)		Voltage ac and dc: 0 to 1000 units	Troubleshooting and maintenance procedures

Table 1-4. Antenna Coupler, Equipment and Publications Required but Not Supplied (Cont)

CATEGORY	RECOMMENDED EQUIPMENT	ALTERNATE	EQUIPMENT TEST PARAMETERS	APPLICATION
Multimeter (Cont)			Current: 0 to 10 amperes Resistance: 0 to infinity Input Impedance ac or dc: 11 megohms per 100k ohms	
Rf Voltmeter	04901-91H-S7 (or equiv)		Frequency Range: 20 kHz to 1.2 GHz Voltage Range: 1 mV-3V	Troubleshooting and maintenance procedures
Network Analyzer	Hewlett-Packard 675A/676A (or equiv)		Frequency Range: 10 kHz to 32 MHz Input-Output Impedance: 50 ohms Amplitude Range: 0 to -80 dBm Phase Range: 0° to 360°	Troubleshooting and maintenance procedures
Rf Random Noise Generator	Aerospace Research Inc. Model NS-C (or equiv)		Frequency Range: 1-500 MHz Output Impedance: 50 ohms, unbalanced Noise Figure Range: 0-16 dB	Troubleshooting and maintenance procedures

Table 1-4. Antenna Coupler, Equipment and Publications Required but Not Supplied (Cont)

CATEGROY	RECOMMENDED EQUIPMENT	ALTERNATE	EQUIPMENT TEST PARAMETERS	APPLICATION
Rf Random Noise Generator (Cont)			Excess Noise Range in °k: 0-12,000	
Noise and Field Intensity Meter	Singer Company Model NF-105 (or eqiv)		Frequency Range: 150KHz - 100 MHz Input Impedance: 50 ohms Interference Range: 1/BW(MHz) to 100,000/BW(MHz) microvolts/MHz	Troubleshooting and maintenance procedures
Fixed Attenuator	Applied Research Inc. HFA-50 (10 dB) (or eqiv)		Attenuation: 10 dB Impedance: 52.5 ohms nominal Frequency Range: DC to 1000 MHz Connector: BNC	Troubleshooting and maintenance procedures
Fixed Attenuator	Applied Research, Inc. HFA-50 (20 dB) (or equiv)		Attenuation: 20 dB Impedance: 52.5 ohms, nominal Frequency Range: DC to 1000 MHz	Troubleshooting and maintenance procedures

Table 1-4. Antenna Coupler, Equipment and Publications Required but Not Supplied (Cont)

CATEGORY	RECOMMENDED EQUIPMENT	ALTERNATE	EQUIPMENT TEST PARAMETERS	APPLICATION
Fixed Attenuator (Cont)			Connector: BNC	
Termination (Qty 3)	Applied Research Inc. HFT-50 (or equiv)		Impedance: 50 ohms nom. Frequency range: Dc to 1000 MHz Connector: BNC	Troubleshooting and maintenance procedures
Variable Attenuator	2840-355C (or equiv)		Attenuation: 12 dB in 1 dB steps Frequency: DC to 1 GHz Impedance: 50 ohms	Troubleshooting and maintenance procedures
Variable Attenuator	2840-355D		Attenuation: 120 dB in 10 dB steps Frequency: DC to 1 GHz Impedance: 50 ohms	Troubleshooting and maintenance procedures

Table 1-4. Antenna Coupler, Equipment and Publications Required but Not Supplied (Cont)

CATEGORY	RECOMMENDED EQUIPMENT	ALTERNATE	EQUIPMENT TEST PARAMETERS	APPLICATION
Power Combiner	Aiken Electronics Model H8010 (or equiv)		Isolation: 4 dB, 1-32 MHz Impedance: 50 ohms VSWR: 1.2:1 max	Troubleshooting and maintenance procedures
Post Amplifier	Aiken Electronics Model A3002 (or equiv)		Gain: 20 dB Noise Figure: 6 dB Impedance: 50 ohms	Troubleshooting and maintenance procedures
CAQI-606-B Technical Manual	NAVSHIPS 0967-107-7010			Troubleshooting and maintenance procedures
AN/USM-281( ) Technical Manual	NAVSHIPS 0969-244-3010 and 0669-244-3020			Troubleshooting and maintenance procedures
AN/USM-206 Technical Manual	NAVSHIPS 0969-002-7020			Troubleshooting and maintenance procedures
Sweep General Model 675A operating and service manual	Hewlett-Packard 00675-90000			Troubleshooting and maintenance procedures

Table 1-4. Antenna Coupler, Equipment and Publications Required but Not Supplied (Cont)

CATEGORY	RECOMMENDED EQUIPMENT	ALTERNATE	EQUIPMENT TEST PARAMETERS	APPLICATION
Phase/Amplitude Tracking Detector Model 676A Operating and Device Manual	Hewlett-Packard 00676-90000			Troubleshooting and maintenance procedures
RF Random Noise Generator Instruction Sheet	Aerospace Research Inc. Pub No. 420			Troubleshooting and maintenance procedures
Noise and Field Intensity Meter Model NF-105 Manual	Singer Company			Troubleshooting and maintenance procedures

Table 1-5. Antenna Couplers, Factory Changes

CHANGE NUMBER	NOMENCLATURE	DESCRIPTION

Table 1-6. Antenna Couplers, Field Changes

CHANGE NUMBER	NOMENCLATURE	DESCRIPTION

CHAPTER 2

OPERATION

2-1. INTRODUCTION.

2-2. The antenna couplers, once installed require only that the operator turn it on. The antenna couplers are usually located in a remote and unattended location, and must be operated in conjunction with a receiver system.

2-3. OPERATING CONTROLS AND INDICATORS.

2-4. The only operator control is the POWER ON-OFF switch. Table 1-1 lists the front panel controls, and indicators. Figure 2-1 illustrates the front panel of the antenna coupler.

2-5. TURN ON-TURN OFF PROCEDURE.

2-6. To turn on the antenna coupler, set the POWER ON-OFF switch 1S1 in the ON position, lamp 1DS1 is illuminated. To turn off the antenna coupler, place the POWER ON-OFF switch 1S1 in the OFF position, lamp 1DS1 is extinquished.

2-7. MAINTENANCE CONNECTORS.

2-8. Table 2-2 lists the connectors used for maintenance of the antenna couplers and are shown in Figure 2-2. Table 2-2 list the maintenance connectors by name and operating function.

Table 2-1. Operating Control and Indicators

REFERENCE DESIGNATION	NAME	POSITION	OPERATING FUNCTION
1DS1	Power on Indicator Lamp		Lights when POWER ON-OFF switch 1S1 is in the ON position.
1F1, 1F2	1 AMP fuse		Protects antenna coupler against overload: indicator glows when fuse is open.
1F3	SPARE fuse		Stores (spare) one ampere, Slo-Blo fuse.
1S1	POWER switch		Used to turn on and off antenna coupler.
		ON	Power applied to antenna coupler
		OFF	No power applied to antenna coupler

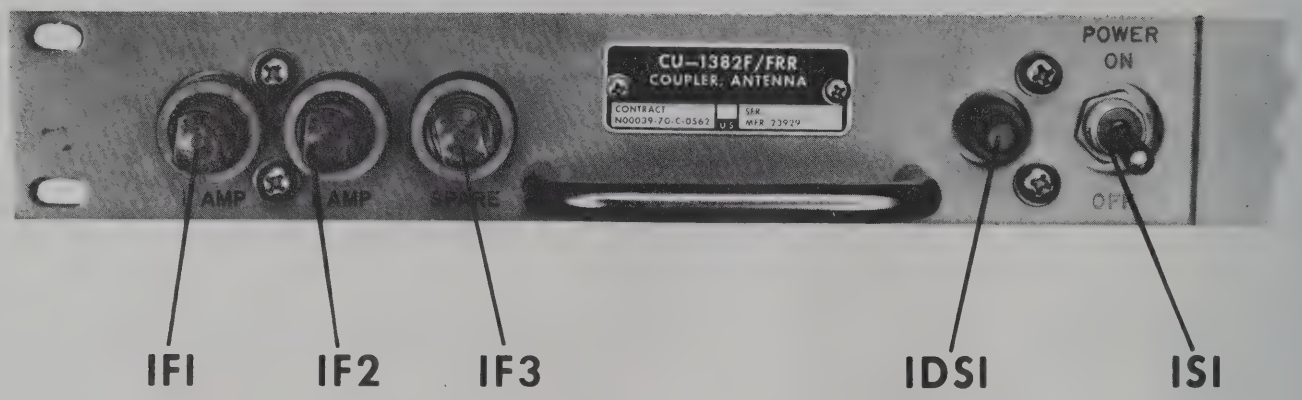


Figure 2-1. Antenna Coupler, Operating Controls and Indicators

Table 2-2. Maintenance Connectors

REFERENCE DESIGNATION	NAME	OPERATING FUNCTION
1A2J3 thru 1A2J10	OUTPUTS 1 thru 8 BNC Connectors	Connects antenna coupler outputs to eight receivers. Rf signals identical in characteristics as INPUT signal.
1J1	Ac Connector	Connects ac power from source to antenna coupler
1J2	INPUT BNC Connector	Connects antenna rf signal to antenna coupler.

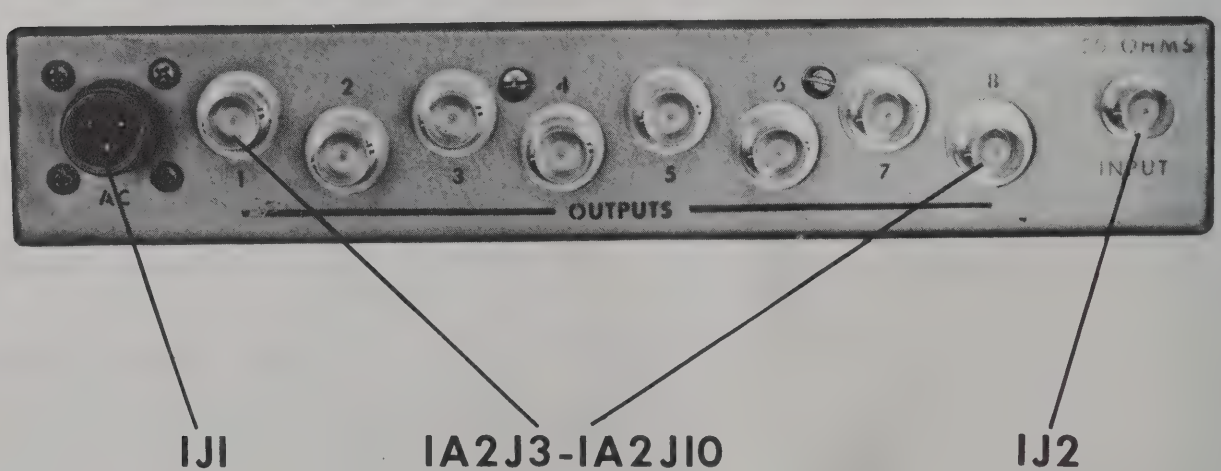


Figure 2-2. Antenna Coupler, Rear Panel Connectors

CHAPTER 3

FUNCTIONAL DESCRIPTION

3-1. INTRODUCTION.

3-2. This chapter describes the principles of operation of the antenna coupler. The description is presented in two levels. The first level is an overall functional description of the antenna coupler to the level of detail shown on the functional block diagram. The second level is a more detailed discussion based on the RF signal flow diagram, power distribution diagram and the maintenance schematic diagrams. Detailed circuit descriptions are discussed in this second level when the electronic circuits differ substantially from those covered in NAVSHIPS 0967-000-0120.

3-3. OVERALL FUNCTIONAL DESCRIPTION.

3-4. An overall functional block diagram of the antenna coupler is given in Figure 3-1. The order of presentation in the figure and the text below follows the signal flow through the antenna coupler from rf input from the antenna to the eight rf outputs to the receivers.

3-5. The rf signal from the antenna passes through the rf filter 1A1 where all rf signals below 2.0 MHz and above 32 MHz are attenuated. The filtered rf signal is then fed to the divider assembly 1A2, where the one rf input signal is divided into eight rf output signals. The divider assembly of the divider assembly contains a high level signal protector relay 1A2K1 that opens when an input signal level greater than 5 vrms (nom) occurs. The rf signal is then applied to emitter followers 1A2Q2 and 1A2Q3, where a gain of approximately 1 dB is experienced. The emitter follower outputs are paralled to eight emitter follower circuits, consisting of 1A2Q4 through 1A2Q11. A gain of approximately 1 dB occurs at each of these emitter follower outputs, which are also the eight rf signal outputs to the receivers.

3-6. The ac power is applied through the ac line filters 1FL1 and 1FL2 to the power supply 1A3. The filters are used to prevent rf interference from entering the antenna coupler from the input power source. The power supply reduces the input voltage and rectifies and regulates it for an output voltage of +23.5 Vdc regulated. The regulated voltage is applied to the divider assembly 1A2 and provides the transistor operating voltage.

3-7. MAJOR FUNCTIONAL AND CIRCUIT DESCRIPTIONS.

3-8. GENERAL. The antenna coupler performs one function and that is to divide one rf signal input into eight rf signal degradation. The description that follows are based on the rf signal flow diagram, power distribution diagram and the maintenance schematics of each of the subassemblies and are contained in Chapter 5. Troubleshooting procedures, maintenance turn on procedures, and test data are contained in Chapter 5 also.

3-9. RF SIGNAL DISTRIBUTION.

3-10. GENERAL. Refer to the rf signal flow diagram Figure 5-1 for the following discussion. The antenna rf signal is applied to the rf filter 1A1 through the BNC jack 1J2. The rf filter 1A1, a 2 to 32 MHz bandpass filter, eliminates the out-of-band signals. The filtered rf signal is passed through cable assembly 1W1 to the divider assembly 1A2. The input circuit of the divider assembly consists of resistor 1A2R5 in parallel with the contacts of signal protector relay 1A2K1. The relay contacts are shown in the unenergized position. When power is applied to the divider assembly, the relay contacts close, permitting the rf signal to flow through the contacts. In the event of an rf signal greater than 5 volts rms (nom) the relay contacts open permitting the rf signal to pass only through resistor 1A2R5 thereby reducing the rf signal level sufficiently to avoid damaging the emitter followers. The circuit consisting of transformer 1A2T1 and emitter followers 1A2Q1 and 1A2Q2 provides a push-pull circuit with two outputs, 180° out of phase. These two signals are connected to the input of the eight emitter followers 1A2Q4 through 1A2Q11 which operate as push-pull circuits and provide a 1 dB gain. The outputs of the emitter follower pairs (1A2Q4 - 1A2Q5, for example) are fed to transformer 1A2T2, 1A2T4, 1A2T6, and 1A2T8, which provide the single ended drive for the output transformers 1A2T3, 1A2T5, 1A2T7, and 1A2T9. These transformers, with the matching networks (1A2L6 - 1A2R19, 1A2L7 - 1A2R25, 1A2L8 - 1A2R31, 1A2L9 - 1A2R37) form four balanced hybrid transformers with greater than 40 dB isolation between outputs. These outputs (two from each hybrid circuit) feed the eight output ports, 1A2J3 through 1A2J10 and provide greater than 40 dB isolation between output pairs 1A2J3 - 1A2J4, 1A2J5 - 1A2J6, 1A2J7 - 1A2J8, 1A2J9 - 1A2J10. The isolation between ports other than the listed parts is obtained from the emitter follower driver isolation.

3-11. RF FILTER, 1A1, PN34-0121, CU-1382F/FRR. Refer to the maintenance schematic of the rf filter figure 5-6, for the following discussion. This filter has a high band edge rejection capability, minimum insertion loss, and hence minimum contribution to the antenna coupler noise figure. This filter is an elliptic function type bandpass filter consisting of a low pass input filter and high pass output filter with a 50 ohm nominal impedance. The bandpass frequency range is 2 to 32 MHz, with the upper skirt in the band of 32 to 40 MHz and the lower skirt in the band of 1.6 to 2 MHz. Refer to figure 3-2, the attenuation in the 14 kHz to 1.6 MHz band is -50 dB and in the 40 to 80 MHz band is -30 dB. In the 80 to 150 MHz band the attenuation is -40 dB.

3-12. The input rf signal from the antenna is applied to the input jack 1A1J1. The low pass filter consisting of 1A1L1, 1A1L3, 1A1L5, 1A1L7, and the components connected to ground, 1A1C1, 1A1L2, 1A1C2, 1A1L4, 1A1C3, 1A1L6, and attenuate the frequencies above 32 MHz, with a skirt between 32 and 40 MHz. The high pass filter output consisting of 1A1C4, 1A1C6, 1A1C8, 1A1C9, 1A1C11, and the components connected to ground 1A1C5 and 1A1L8, 1A1C7 and 1A1L9, 1A1C10 and 1A1L11 attenuate the frequencies below 2 MHz with a skirt in the band 1.6 to 2 MHz. The band pass filtered rf signal is then fed through the output connector 1A1J2 to the divider assembly 1A2.

3-13. RF FILTER, 1A1, PN34-0122. CU-1382G/FRR. Refer to the maintenance schematic of the rf filter figure 5-7 for the following discussion. The filter has a high band edge rejection capability, minimum insertion loss, and a minimum contribution to the antenna coupler noise figure. This filter is an elliptic bandpass filter consisting of a low pass input and a high pass output with a 50 ohm impedance. The bandpass

frequency range is 2 to 32 MHz, with an upper skirt in the band of 32 to 40 MHz, and a lower skirt in the band of 1.6 to 2 MHz. Refer to figure 3-2, the attenuation versus frequency plot for the RF filter. The minimum attenuation in the 14 kHz to 1.6 MHz band is -28 dB in the 40 to 50 MHz band is 30 dB.

3-14. The rf input signal from the antenna is applied to the input jack 1A1J1. The low pass input section consisting of 1A1L1, 1A1L3, 1A1L5, and the components connected to ground, 1A1C1 and 1A1L2, 1A1C2 and 1A1L4, and 1A1C3 attenuate the frequencies above 32 MHz, with a skirt between 32 and 40 MHz. The high pass output section consisting of 1A1C6 and 1A1C9 and the components connected to ground, 1A1C5 and 1A1L8, 1A1C7 and 1A1L9, 1A1C10 and 1A1L11, attenuate the frequencies below 2 MHz, with a skirt in the band of 1.6 to 2 MHz. The bandpass filtered rf signal is then fed through the output connector 1A1J2 to the divider assembly 1A2.

3-15. DIVIDER ASSEMBLY, PN34-0086-1, CU-1382F/FRR. Refer to the maintenance schematic of the divider assembly, figure 5-8. The divider assembly is used to divide the one reciever input signal into eight rf output signals with no degradation in input signal characteristics. The divider assembly has an rf signal input protection circuit and provides a high output-to-output isolation. The input rf signal also experiences a gain of approximately 2 dB at the output.

3-16. The rf signal from the rf filter 1A1 is applied to the BNC input jack 1A2J2 through a parallel circuit consisting of resistor 1A2R5 and the contacts of relay 1A2K1. These contacts are open in the unenergized state. When +23.5 volts dc is applied to the divider assembly and the rf input signal level is less than 5 volts rms, relay 1A2K1 is energized. closing the contacts. Therefore, the signal flows through the closed contacts of 1A2K1 to the input transformer 1A2T1, bypassing 1A2R5.

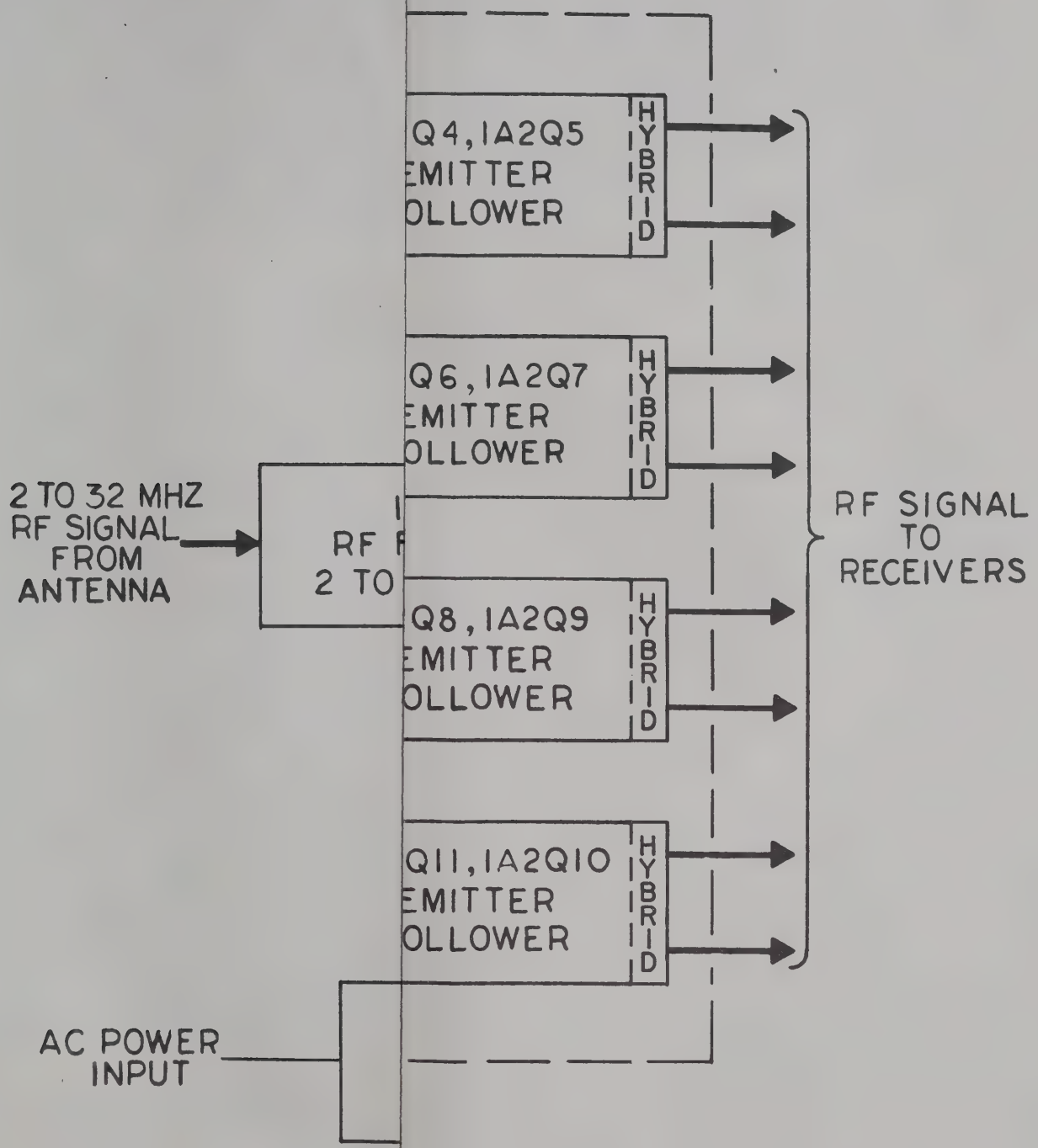
3-17. When the rf input signal is greater than 5 volts rms, the contacts of relay 1A2K1 open, passing the rf signal through resistor 1A2R5, where there is a drop in level sufficient to prevent damaging the emitter followers in the divider circuit. The power supply 1A3 has current limiting, which is set 15 or 20% higher than the normal current requirements. When the rf input signal is greater than 5 volts rms, the transistors in the divider assembly 1A2 will draw more current, dropping the +23.5 volts dc to some lower voltage, causing capacitors 1A2C10 and 1A2C11 to discharge through diode 1A2CR1. As the base voltage of transistor 1A2Q3 drops below the +5.3 volt reference voltage of Zener diode 1A2CR3, transistor 1A2Q3 is cut off. With transistor 1A2Q3 cut off, relay 1A2K1 is de-energized, opening the contacts, enabling the rf signal to flow through resistor 1A2R5. Resistor 1A2R5 reduces the input signal by 18 to 20 dB. With relay 1A2K1 open, the power supply comes out of the current limiting state, charging capacitors 1A2C10 and 1A2C11 through resistor 1A2R6. The bias point of transistor 1A2Q3 is set up by the bleeder combination consisting of 1A2R6, 1A2R7 and 1A2R8, further slowing the charging time of capacitors 1A2C10 and 1A2C11. The RC charge time is approximately 0.8 seconds for an rf input signal of 10 volts rms. Relay 1A2K1 closes for approximately 15 milliseconds and then opens. In the event the strong signal is still present, the relay will reopen and the cycle is repeated until the strong signal is removed. Zener diode 1A2CR2 is used to assure that capacitors 1AC10 and 1A2C11 charge properly in cold operating tempatures when leakage current is higher than normal. Capacitor 1A2C9 is used to prevent erractic operation of relay 1A2K1. Resistor 1A2R9 is used to set up the 5.6 volt reference voltage

of Zener 1A2CR3. The resistor holds the reference voltage for a sharp cut off when the +23.5 volts is dropping. This occurs in an rf signal input overload condition.

3-18. The divider assembly active circuits are emitter followers connected in a push-pull configuration. Since emitter followers normally provide less than unity gain, gain is obtained by the use of stepup transformers. Both the input and output circuits contain this type of transformer. The output-to-output isolation is accomplished by a transformer hybrid circuit. A simplified schematic of the transformer hybrid circuit is shown in figure 3-3. When a signal is applied across Rc two voltages of equal amplitude and three dB lower than the input signal will appear across both Rb and Rd. If this transformer is properly terminated at all ports, no signal power will be dissipated in Ra. When a signal is applied to Rb, the signal will divide equally between Ra and Rc and a very small amount across Rd (40 dB down or more from Rb). This isolation is dependent upon the terminating impedances at Ra and Rc. In the divider assembly, since stepup ratios are used in the transformers to provide gain, the terminating impedances are higher than shown in the simplified schematic.

3-19. The push-pull circuit consists of emitter followers 1A2Q1 and 1A2Q2, transformers 1A2T1 and all the attached components. Voltage divider resistors 1A2R1 and 1A2R2 set up the bias voltage of the emitter followers 1A2Q1 and 1A2Q2. Since the output emitter followers 1A2Q4 through 1A2Q11 are dc coupled to the input emitter followers 1A2Q1 and 1A2Q2, 1A2R1 and 1A2R2 are also set up their bias voltage. The emitter bias 1A2R11 and 1A2R12 of emitter followers 1A2Q1 and 1A2Q2, maintain a +9.2 volt level at the emitter. Capacitor 1A2C1, 1A2C2, 1A2C8 and inductor 1A2L1 are used for ac isolation. Inductors 1A2L4 and 1A2L5 provide high frequency peaking and resistor 1A2R10 and 1A2R13 provide the load matching for the collectors of 1A2Q1 and 1A2Q2. These components provide 50 dB attenuation between input and output rf signals. Ferrite beads are used throughout the divider assembly as rf energy absorbers. Ferrite beads are used on capacitor leads to reduce the series Q thus, reducing the tendency to cause undesired oscillations. The dc blocking capacitors 1A2C3 and 1A2C4 provides protection for input transformer 1A2T1, in the event a dc voltage is applied to the rf input of the divider assembly. The impedance matching network at the secondary of transformer 1A2T1 consisting of capacitor 1A2C5, resistors 1A2R3 and 1A2R4, and inductors 1A2L2 and 1A2L3 provides the 50 ohm impedance match. The value of capacitor 1A2C5 is selected for optimum match, and may not be required. Refer to the maintenance schematic figure 5-8 for a nominal value. The values of capacitors 1A2C6 and 1A2C7 are selected to provide ac balance to the input of transformer 1A2T1.

3-20. The four inputs of the output circuits (1A2Q4 through 1A2Q11) are parallel connected, and driven from the push-pull input circuit pair 1A2Q1 and 1A2Q2. The four push-pull output circuits are identical, therefore, only one will be discussed. Resistors 1A2R14 and 1A2C12 are rf decoupling components. The rf impedance match of the one ohm emitter impedance of 1A2Q4 and 1A2Q5 to the 26 ohms impedance required by each half of the primary of transformer 1A2T2 is provided by resistors 1A2R22 and 1A2R23. The third resistor of this network, 1A2R30, is connected to the center tap of the primary of 1A2T2 to provide the proper dc bias to the emitter follower pair 1A2Q4 and 1A2Q5. The series reactance of transformer 1A2T2 must be tuned out to provide an impedance match to transformer 1A2T3 for hybrid operation. The variable capacitor 1A2C17 in parallel with capacitor 1A2C16 is adjusted for



a Coupler, Overall Functional Block Diagram

of Zener 1A2CR3. The resistor holds the reference voltage for a sharp cut off when the +23.5 volts is dropping. This occurs in an rf signal input overload condition.

3-18. The divider assembly active circuits are emitter followers connected in a push-pull configuration. Since emitter followers normally provide less than unity gain, gain is obtained by the use of stepup transformers. Both the input and output circuits contain this type of transformer. The output-to-output isolation is accomplished by a transformer hybrid circuit. A simplified schematic of the transformer hybrid circuit is shown in figure 3-3. When a signal is applied across Rc two voltages of equal amplitude and three dB lower than the input signal will appear across both Rb and Rd. If this transformer is properly terminated at all ports, no signal power will be dissipated in Ra. When a signal is applied to Rb, the signal will divide equally between Ra and Rc and a very small amount across Rd (40 dB down or more from Rb). This isolation is dependent upon the terminating impedances at Ra and Rc. In the divider assembly, since stepup ratios are used in the transformers to provide gain, the terminating impedances are higher than shown in the simplified schematic.

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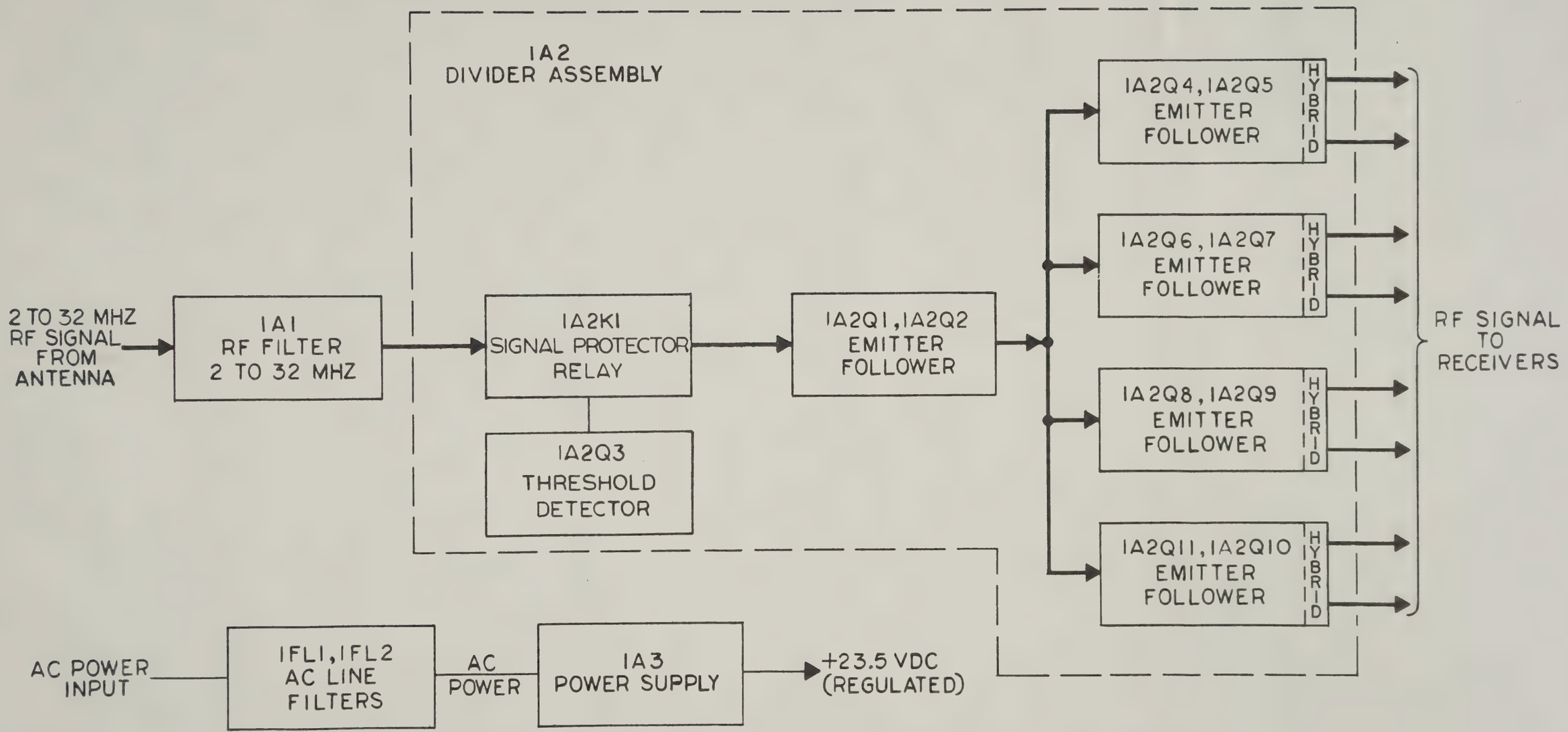


Figure 3-1. Antenna Coupler, Overall Functional Block Diagram

maximum output-to-output isolation. The impedance ratios of transformers 1A2T2 and 1A2T3 were selected to obtain a slight voltage gain. Resistor 1A2R34 provides the termination for T3 necessary for maximum hybrid isolation. Inductor 1A2L6 provides optimum isolation at the high end of the frequency band. The reactance for a 50 ohm impedance at the output jack 1A2J3 and 1A2J4 is obtained by capacitors 1A2C24 and 1A2C25.

3-21. DIVIDER ASSEMBLY, 1A2, PN34-0086-2, CU-1382G/FRR. Figure 5-9 is the maintenance schematic. This divider assembly is similar to divider assembly, 1A2, PN-0086-1 except for the addition of capacitors 1A2C32 through 1A2C39, used for the phase tracking requirement of the CU-1382G/FRR. Refer to paragraph 3-15 for the detailed discussion of the divider assembly. The rf signal is fed to transformers 1A2T2, 1A2T4, 1A2T6, and 1A2T8 in phase with each other, to their respective output transformers 1A2T3, 1A2T5, 1A2T7, and 1A2T9. Since the rf signal is applied to the center taps of the output transformers, the rf signal voltage splits and is in phase at both ends of the primary winding. The adjustable capacitors 1A2C32 through 1A2C39 are connected to each end of the primary winding of the output transformers 1A2T3, 1A2T5, 1A2T7, and 1A2T9 to compensate for the accumulation of small differences intolerances in components and differences in lead length. Phase tracking is optimized by adjusting the variable capacitors 1A2C32 through 1A2C39.

3-22. POWER DISTRIBUTION.

3-23. GENERAL. Refer to the AC power distribution, figure 5-2 for the following discussion. The antenna coupler is designed for primary power operation of 94.5 to 137.5 volts ac, 189 to 275 volts ac, 47.5 to 63 Hz single phase. The cross connections on transformer 1A3T1 primary determines the primary power line voltage required. Section 8, paragraph 9, lists the cross connections and voltages. The antenna coupler is factory wired for 103.5 to 126.5 volt operation.

3-24. The ac power is applied to the antenna coupler through cable assembly 1W2 to ac jack 1J1. The front panel POWER ON-OFF toggle switch 1S1 controls the application of power. In the ON position of switch 1S1 the red indicator lamp 1DS1 lights. Fuses 1F1 and 1F2 are 1 AMP Slo-Blo fuses that protect the antenna coupler. Filters 1FL1 and 1FL2 are used to prevent rf interference from entering the antenna coupler from the primary power lines. The primary power is applied from the filters to the primary of transformer 1A3T1 where it is stepped down to approximately 33.5 volts ac (nom.) at the secondary. The remainder of the power supply provides regulation and filtering to obtain the +23.5 volts dc regulated.

3-25. POWER SUPPLY, 1A3, PN 34-0187. The power supply, figure 5-10, provides the +23.5 volts dc regulated voltage for the divider assembly 1A2. The divider assembly requires 800 milliamperes of current. The power supply is current limited at approximately one ampere. The dc output terminal at jack 1J1 pin A can be shorted without causing damage to the power supply circuits or opening fuses 1F1 or 1F2. The power supply 1A3 contains a printed circuit card that houses the regulator assembly 1A3A1 components. The transformer 1A3T1 secondary terminals 9 and 10 are connected to a full wave bridge rectifier with a two ampere rating consisting of 1A3A1CR1 through 1A3A1CR4. Capacitor 1A3C1 filters the bridge output voltage. Zener diodes 1A3A1CR5 throught 1A3A1CR7 and the bleeder resistor 1A3A1R1 set a reference voltage of 27.3 volts dc. Voltage regulator transistor 1A3A1Q1 with its operating voltages set by resistors 1A3A1R3 through 1A3A1R5 and 1A3A1R12 buffers the reference voltage and provides base

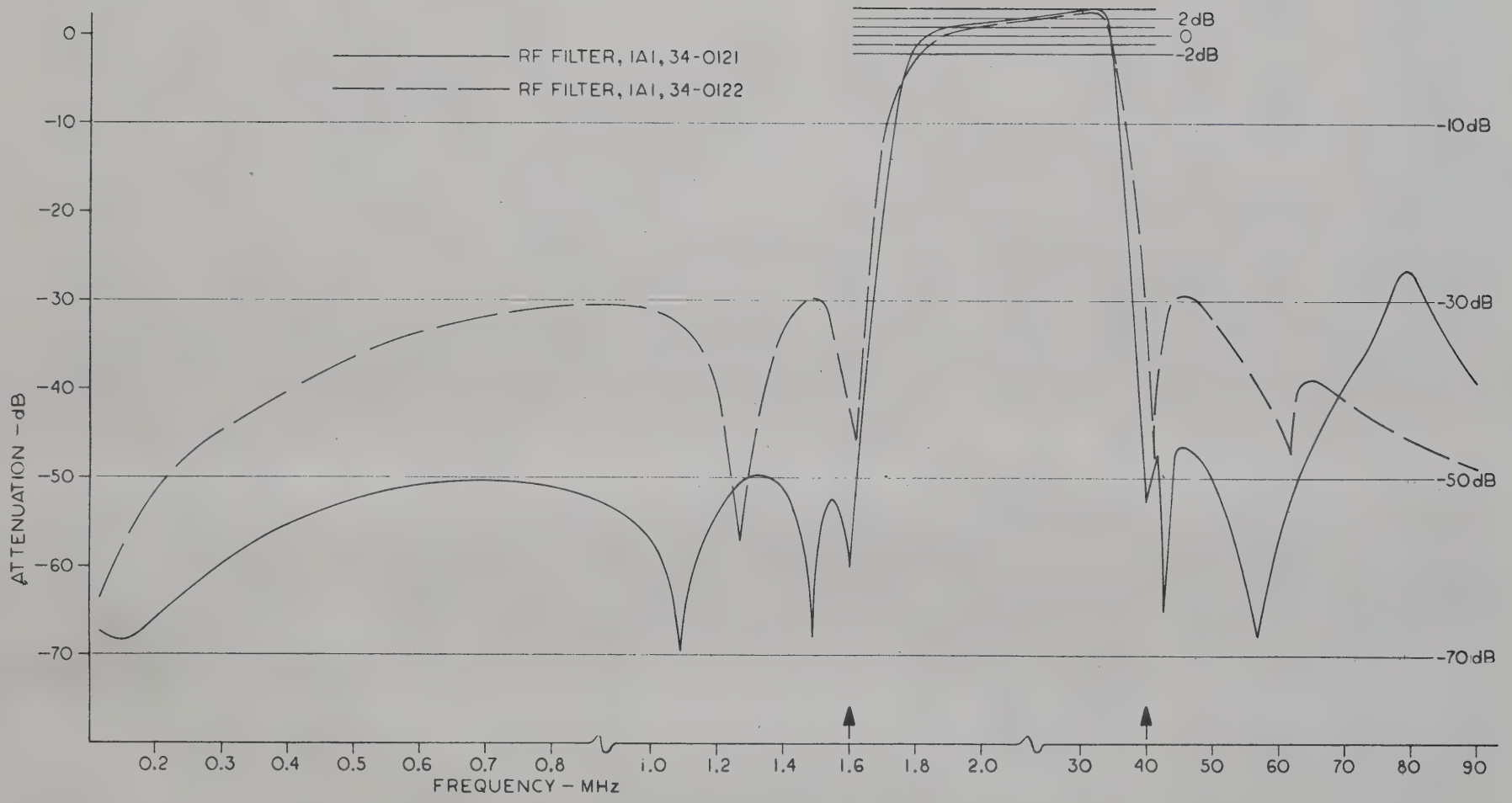


Figure 3-2. Attenuation versus Frequency

drive for 1A3Q1 and 1A3Q2. DC amplifier 1A3A1Q2 is biased by resistor 1A3A1R6. The two series pass transistors 1A3Q1 and 1A3Q2 provide the regulated 23.5 volts dc from the unregulated 40 volts dc output of the bridge rectifier. The current limit sensing transistor 1A3A1Q3 is controlled by the voltage drop across resistors 1A3A1R7 and 1A3A1R8. Transistor 1A3A1Q3 conducts as a direct function of the voltage drop across resistors 1A3A1R7 and 1A3A1R8. This causes the base voltage of transistor 1A3A1Q2 to decrease, which in turn causes the series pass transistor 1A3Q1 and 1A3Q2 to reduce the +23.5 volts dc output voltage. A voltage divider formed by 1A3A1R9 and 1A3A1R10 averages the voltage differences applied to the base transistor 1A3Q1Q3. The difference in emitter voltage at 1A3Q1 and 1A3Q2 are caused by the dc beta spread of these transistors. The noise generated by the bridge rectifies 1A3A1CR1 through 1A3A1CR4 and the Zener diode 1A3A1CR5 through 1A3A1CR7 is filtered by capacitors 1A3A1C1 and 1A3A1C2. Capacitor 1A3A1C3 filters the dc output.

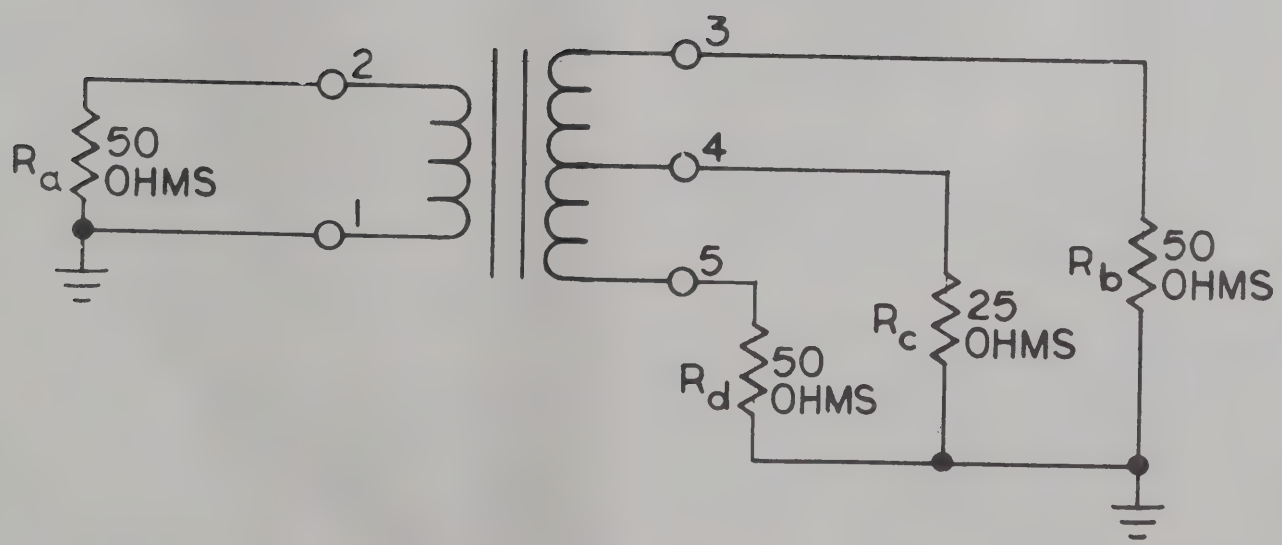


Figure 3-3. Transformer Hybrid Simplified Schematic Diagram

CHAPTER 4

SCHEDULED MAINTENANCE

4-1. INTRODUCTION.

4-2. This chapter contains the step-by-step procedure to verify that the antenna couplers are operating satisfactorily. Performance testing is to be accomplished on a semiannual basis. No preventive maintenance is required for the antenna couplers.

4-3. SCHEDULED PERFORMANCE TEST.

4-4. PROCEDURE. Table 4-1 contains the detailed procedure for accomplishing the semiannual performance tests. The title and description of the test, safety precautions, the minimum rating of the technician expected to perform the test, preliminary procedures, and reference to troubleshooting or corrective actions are given with each of the detailed maintenance test procedures. It is recommended that each test procedure be read through to its completion before the test begun.

4-5. SAFETY PRECAUTIONS. The attention of officers and operating personnel is directed to Chapter 67 of the Bureau of Ships Manual or superseding instruction on the subject of Electronic Safety precautions to be observed. While every practicable safety precaution has been incorporated into this equipment, the rules in the following paragraphs must be strictly observed.

WARNING

Failure to comply with the instructions in the following paragraphs may result in severe electrical shock. Maintenance personnel must at all time observe all safety regulations.

4-6. Make sure you are not grounded whenever making measurements or adjustments. For example, hand rails, exposed metal decks, or equipment frames may provide inadvertent ground contacts.

4-7. Ground the case of test equipment whenever possible, and before starting measurements where test equipment must be held or adjusted during the measurements.

4-8. To avoid casualties, always remove power from set and connect a ground first. Under certain conditions, dangerous potentials may exist in circuits with power controls in the off position, due to charges retained by capacitors.

4-9. Be carefull even when measuring low voltages. Do not forget that high voltages may be present across terminals which are normally low voltage.

Table 4-1. Semiannual Scheduled Performance Test

TEST NO.	REFERENCES AND PROCEDURES
S1	Check rf Output Gain DESCRIPTION: Measure rf output signal gain at each of the eight output connectors. SAFETY PRECAUTIONS: Observe standard safety precautions (refer to paragraph 4-5). MINIMUM TECHNICAL RATING REQUIRED FOR TEST: ET3 TOOL AND EQUIPMENT REQUIRED: Rf Signal Generator CAQ1-606B Oscilloscope AN/USM-281 PRELIMINARY SETUP: 1. Connect signal generator and oscilloscope to power source and turn ON; allow a 10-minute warmup. 2. Disconnect antenna coupler input. 3. Adjust signal generator output to -2 dBm at 2 MHz. 4. Connect test cable between signal generator rf output and oscilloscope vertical input. The scope must be terminated with 50 ohms. 5. Adjust oscilloscope verticle gain for a 3 centimeter display. 6. Disconnect test cable from oscilloscope and connect to the input jack J2 of antenna coupler. 7. Disconnect all antenna coupler outputs. TEST PROCEDURE: 1. Connect test cable between oscilloscope vertical input (terminated) and output jack 1A2J 10(1) of antenna coupler. 2. Adjust attenuator on signal generator for 3 centimeter vertical display on oscilloscope.

Table 4-1. Semiannual Scheduled Performance Test (Cont)

TEST NO.	REFERENCES AND PROCEDURES
	3. Note gain in dBm at signal generator. Gain should be between 1 and 5 dBm. 4. Repeat steps 1 through 3 for: OUTPUT — JACK 2 — 1A2J9 3 — 1A2J8 4 — 1A2J7 5 — 1A2J6 6 — 1A2J5 7 — 1A2J4 8 — 1A2J3 TROUBLESHOOTING REFERENCE: Figure 5-1.

CHAPTER 5

TROUBLESHOOTING

5-1. INTRODUCTION.

5-2. This chapter contains data, procedures and diagrams to aid the maintenance technician in identifying and analyzing malfunctions, localizing troubles to the malfunctioning assembly and isolating faults to a stage or circuit within that assembly. A procedure is provided which gives instructions for initial checks and test setups. From this procedure, overall equipment operability can be ascertained and inoperative functions can be identified. Signal flow diagrams provided for each equipment function, together with an overall antenna coupler troubleshooting procedure, serve to localize trouble to the malfunctioning assembly. Fault logic diagrams are provided to help identify faulty circuits. Schematic diagrams and troubleshooting tables are provided for troubleshooting the suspect assemblies and circuits independently.

5-3. TROUBLESHOOTING INDEX.

5-4. Table 5-1 lists the antenna coupler functional areas in alphabetical order and cross-references the appropriate paragraphs and illustrations to be used in trouble analysis of each faulty function.

5-5. RELAY AND LAMP INDEX.

5-6. Table 5-2 provides the maintenance technician with the item reference designation, functional name, energizing voltage, and a reference to the troubleshooting diagram for each coupler relay and lamp.

5-7. PROTECTIVE DEVICES INDEX.

5-8. Table 5-3 lists all antenna coupler protective devices in alphanumerical sequence according to reference designation, with the front panel markings of each device given in the adjacent column. In addition, the electrical rating of the device, and a reference to the applicable troubleshooting diagram are provided in adjacent columns.

5-9. MAINTENANCE TURNON PROCEDURE.

5-10. The antenna coupler maintenance turnon procedure given in table 5-4 energizes the coupler. Apply input power to the electronic test equipments below or equivalent, and allow a 30-minute warm-up period before beginning turnon:

Multimeter AN/USM-311
R-f Generator CAQI-606-B
R-f Voltmeter 04901-91H-57

5-11. TROUBLESHOOTING PROCEDURES.

5-12. The r-f filter 1A1 is a non-repairable item due to its inherent reliability. The filter will not degrade during operation over very long periods. Should the filter be mechanically damaged, replace with a spare unit. All other modules (3) are repairable on a component replacement basis.

Table 5-1. Troubleshooting Index

FUNCTIONAL AREA	TROUBLE-SHOOTING PARAGRAPH	TROUBLE-SHOOTING DIAGRAMS	FUNCTIONAL DESCRIPTION PARAGRAPH	ALIGNMENT/ ADJUST TABLE
AC POWER Distribution	5-9	5-2	3-22	Para. 8-9
DIVIDER ASSEMBLY CU-1382F/FRR	5-9	5-1,5-3 5-8,5-11	3-15	6-1
DIVIDER ASSEMBLY CU-1382G/FRR	5-9	5-1,5-3 5-9,5-11	3-21	6-1
Filter, R-f CU-1382F/FRR	5-9	5-1,5-3	3-11	None
Filter, R-f CU-1382G/FRR	5-9	5-1,5-3	3-13	None
Power Supply	5-9	5-10,5-11	3-22	5-4

Table 5-2. Relay and Lamp Index

REFERENCE DESIGNATION	FUNCTIONAL NAME	ENERGIZING VOLTAGE	TROUBLE-SHOOTING DIAGRAM (FIG. NO.)
1A2K1	RF Input Circuit Protector	12 Vdc	5-1
1DS1	POWER ON Indicator Lamp	115 Vac	5-2

Table 5-3. Protective Devices Index

REFERENCE DESIGNATION	FRONT-PANEL MARKING	RATING		CIRCUIT PROTECTED	TROUBLE-SHOOTING DIAGRAM (FIG. NO.)
		VOLTS	AMPERES		
1F1	1 AMP	250 V	1 ampere	Primary Power	5-2
1F2	1 AMP	250 V	1 ampere	Primary Power	5-2
1E1	--	90 V	20 amperes	RF Input	5-5

5-13. TROUBLESHOOTING DIAGRAMS.

5-14. GENERAL. The troubleshooting diagrams included in this chapter consist of signal flow diagrams, power distribution diagrams, a control diagram, fault logic diagrams, and maintenance diagrams. These diagrams aid the technician in troubleshooting by enabling consecutive narrowing down of a fault to a specific component.

5-15. SIGNAL FLOW DIAGRAM. Signal flow diagram provided for each major equipment function are the main troubleshooting tool. These diagrams show signal paths, connectors, test points, terminals, adjustments, indicators, and circuit stages - the information necessary to isolate a malfunctioning circuit quickly.

5-16. Included with the signal flow diagram are the test data required to obtain the measurements to be made at various points on the diagram. The data include test equipment required, reference to other areas of the manual which may furnish additional information, preliminary setup instructions, and a number of test steps which give step-by-step procedures for obtaining the indication shown at each of the test points indicated on the signal flow diagram.

5-17. The rf filter (1A1) and divider assembly (1A2) require sources and loads of 50 ohms during testing as individual modules. If rf voltage outputs are higher than specified, check to insure that proper loads are used.

NOTE

The 8 output ports of the divider assembly may be operated without 50 ohm terminations if desired, without significantly altering the specified performance.

NOTE

Reference is made to both the CU-1382F/FRR and CU-1382G/FRR. These two units are identical, electrically and mechanically, with the exception of the rf filter (1A1) and the divider (1A2). Where different, the instructions cover each unit individually. The rf filter design for the CU-1382G/FRR provides for phase tracking between outputs of the coupler and for phase tracking between CU-1382G/FRR coupler - the CU-1382F/FRR is not a phase tracking coupler. The divider assembly (1A2) for the CU-1382G/FRR has eight added capacitors to adjust the phase tracking, otherwise it is identical to the CU-1382F/FRR divider assembly.

5-18. AC POWER DISTRIBUTION DIAGRAM. The power distribution diagram (figure 5-2) aids in troubleshooting the circuits involved in primary power. This diagram depicts the distribution of each voltage from its source to the subassembly (1A2).

5-19. FAULT LOGIC DIAGRAMS. Supplementing each signal flow diagram is a fault logic diagram (figures 5-3 and 5-4), which provides a logical troubleshooting procedure with normal values at each test point.

5-20. MAINTENANCE SCHEMATIC DIAGRAMS. Maintenance schematic diagrams are provided for the overall coupler (figure 5-5) and for each of the sub-assemblies (figure 5-6 through 5-10).

Table 5-4. Antenna Coupler 1382F/FRR and 1382G/FRR, Maintenance Turnon Procedure

STEP	OBSERVE	REFERENCE
1. Preliminary procedure	NOTE Perform the preliminary procedure before applying power to the antenna coupler.	
a. Loosen cover screws and remove cover.		
b. Momentarily remove fuses 1F1 and 1F2 and check for proper value. Reinsert fuses.		AC power distribution, figure 5-2.
c. Visually check for any positive indication of electrical or mechanical failures. Insure that all cables and wires are in place and that assemblies are firmly mounted to the chassis.		
2. Overall AC and DC voltage application.		Power Distribution Fault Logic Diagram, figure 5-4.
a. At rear of case, apply 115 Vac to connector 1W2P1.		
b. On front panel, remove fuses 1F1 and 1F2 and replace the fuse caps.		
c. Turn power switch 1S1 to ON.	Fuse indicator for 1F1 and 1F2 illuminate.	Schematic figure 5-5.

Table 5-4. Antenna Coupler 1382F/FRR and 1382G/FRR, Maintenance Turnon Procedure (Cont)

STEP	OBSERVE	REFERENCE
2. Overall AC and DC voltage application (Cont)		
d. Return power switch 1S1 to OFF. Reinstall fuses 1F1 and 1F2 and replace indicator caps.		
e. Turn power switch 1S1 to ON.	Fuse indicators do not illuminate. Lamp 1DS1 illuminates on front panel indicating that 115 Vac is now applied to coupler Power Supply Assembly 1A3.	Schematic figure 5-5.
f. On coupler divider assembly 1A2, locate jack 1A2J1 on the right rear corner of the divider assembly.		
g. Connect Multimeter, AN/USM-311 between 1A2J1 (+) and chassis (-) and observe multimeter.	23.5 Vdc $\pm$ 0.5 Vdc. If greater than 24.0 Vdc or less than 23.0 Vdc, immediately turn power switch 1S1 to OFF and troubleshoot Power Supply Assembly 1A3.	Schematic figure 5-5, 5-10.
3. RF filter check, 1A1		
a. Connect rf Generator, CAQI-606-B to INPUT jack 1J2 and set its output to 0.25 volts at 2.0 MHz.		Fault logic diagram, figure 5-3. Schematic figure 5-6 (CU-1382F/FRR) or figure 5-7 (CU-1382G/FRR) RF Signal Flow Diagram, figure 5-1.

Table 5-4. Antenna Coupler 1382F/FRR and 1382G/FRR, Maintenance Turnon Procedure (Cont)

STEP	OBSERVE	PROCEDURE
3. RF filter check, 1A1 (Cont)		
b. Using rf voltmeter 04901-91H-S7, measure rf voltage at rf filter 1A1J1.	0.25V rf If voltage is low inspect cable and connectors for damage.	
c. Measure rf signal voltage at rf filter 1A1J2	0-285mv rf If low, replace rf filter 1A1.	
4. Divider Assembly 1A2	- - - - - CAUTION - - - - -	Heatsink Removal, figure 5-11.
If heatsink must be removed from divider assembly, study figure 5-11 carefully. Remove 9 screws in row near center of heatsink first, then remove the two screws at rear of heatsink. This frees all transistors from the heatsink. Remove the four screws at the outside corners of the large section of the heatsink, then gently lift off.		
	- - - - - CAUTION - - - - -	
Power must not be on for more than 2 minutes at a time when heatsink is removed. Allow 5 minutes cooling between power applications. Excessive heat will damage transistors.		
a. With rf generator connected to INPUT jack as in step 3, measure rf voltage at input to Divider Assembly 1A2J1.	0.285V rf If low inspect input cables and connectors for damage.	RF Fault Logic Diagram, figure 5-3. Schematic, figure 5-8 (CU-1382F/FRR) Schematic, figure 5-9 (CU-1382G/FRR) RF Signal Flow Diagram, figure 5-1

Table 5-4. Antenna Coupler 1382F/FRR and 1382G/FRR, Maintenance Turnon Procedure (Cont)

STEP	OBSERVE	REFERENCE
4. Divider Assembly, 1A2 (Cont)		
b. Move rf voltmeter to OUTPUT 1, 1A2J10, with 50 ohm load on meter input.	0.29V rf nominal	
c. Repeat measurement for outputs 2 through 8, 1A2J9 through 1A2J3.	0.29V rf nominal If any output measures below 0.28V rf or higher than 0.35V rf, trouble-shoot the divider assembly 1A2.	

TEST DATA FOR FIGURE 5-1

GENERAL

A. Test Equipment Required:
RF Generator CAQI-606-B
RF Voltmeter 04901-91H-S7
Multimeter AN/USM-311

B. References: If necessary, make the following references:
Functional Description, paragraph 3-9
Troubleshooting Sequence, figure 5-3
Heatsink Removal, figure 5-11

C. Relay 1A2K1 shown in unenergized state.

D. 1E1 is a gas-filled surge voltage protector.

E. Preliminary Setup: Set antenna coupler POWER ON-OFF switch 1S1 in the ON position.

F. Test Setup: Connect rf signal generator to INPUT jack 1J2 and set its output for 2 MHz at 0.25V rms.

SPECIFIC

Test Setups:

TS-1	Refer to notes E and F before performing test. Using rf voltmeter measure rf input voltage to rf filter 1A1 from INPUT jack 1J2 as indicated at 1A1J1.
TS-2	Using rf voltmeter, measure rf signal voltage from rf filter 1A1 to divider assembly 1A2 as indicated at 1A1J2.
TS-3	Using rf voltmeter, measure rf signal as indicated at 1A2K1, and using multimeter, measure 10.5 volts dc at collector of 1A3Q3.
TS-4	Using rf voltmeter, measure rf signal voltage from transformer 1A2T1 to the bases of emitter followers 1A2Q1 and 1A2Q2 as indicated.
TS-5	Using rf voltmeter, measure rf signal voltage as indicated at emitters of emitter followers 1A2Q1 and 1A2Q2.
TS-6	Using rf voltmeter, measure rf signal voltage as indicated at emitters of emitter followers 1A2Q4 and 1A2Q11.
TS-7	Measure rf signal at 1A2J3 through 1A2J10, voltage level as indicated.

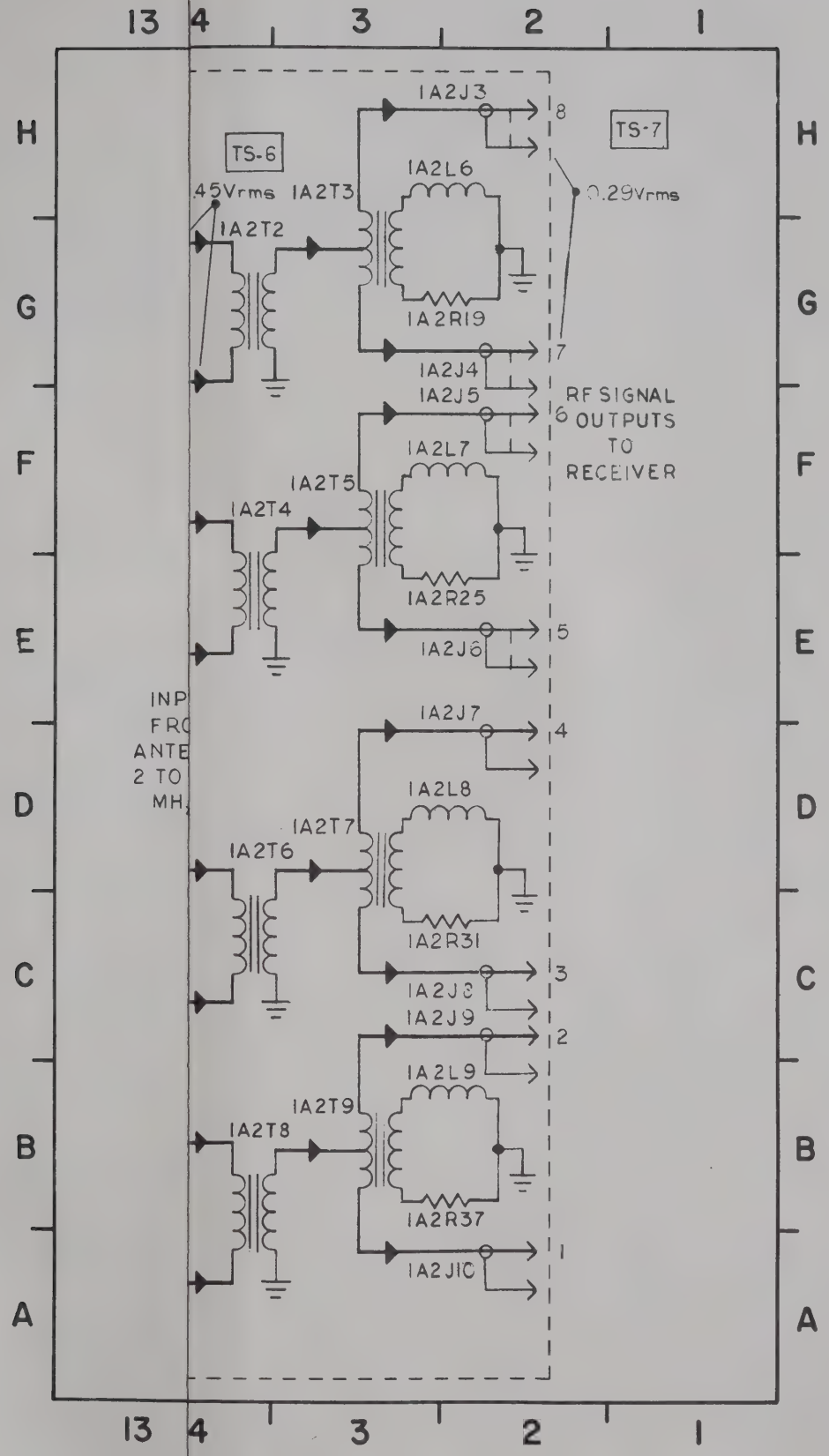


Figure 5-1. RF Signal Flow Diagram

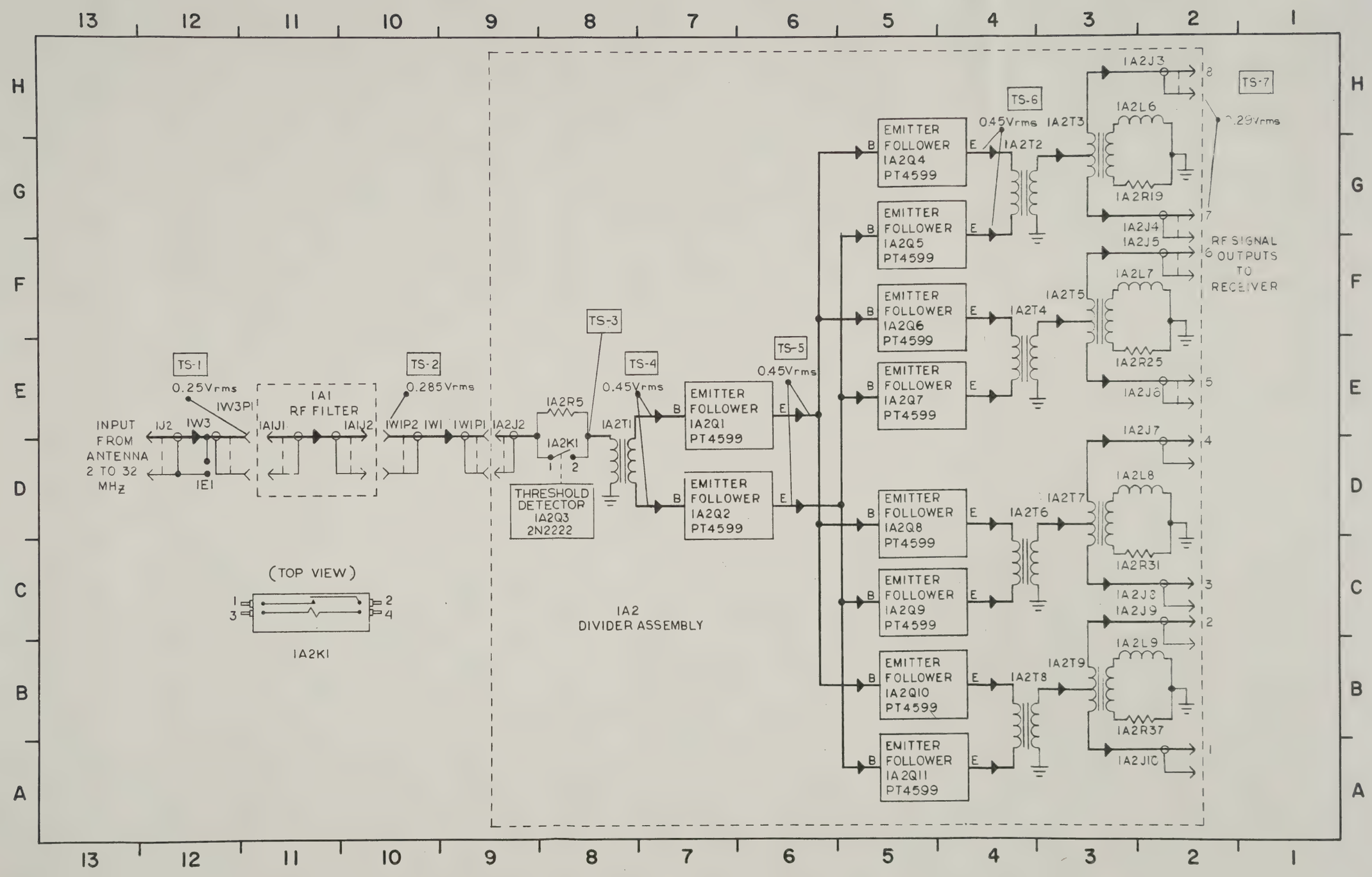


Figure 5-1. RF Signal Flow Diagram

TEST DATA FOR FIGURE 5-2

GENERAL

A. Test Equipment Required:
Multimeter AN/USM-311

B. References: If necessary, make the following references:
Function Description, paragraph 3-22
Troubleshooting Sequence, figure 5-4
Physical Location of Test Points, figure 7-6

C. Preliminary Setup. Set antenna coupler POWER ON-OFF switch in the ON position.

SPECIFIC

Test Setups:

TS-1 Refer to note C before performing test.

NOTE

The antenna coupler may be wired for other than 115 volts operation. Refer to Chapter 8 for the nominal voltages at TS-1 and TS-2.

Using multimeter measure ac input voltage from power cable assembly to ac line filters 1FL1 and 1FL2 as indicated across lamp 1DS1.

TS-2 Using multimeter measure ac voltage at output of line filters 1FL1 and 1FL2 as indicated.

TS-3 Using multimeter measure ac voltage at secondary of transformer 1A3T1 as indicated.

TS-4 Using multimeter measure rectified dc voltage at output of full wave bridge rectifier junction of 1A3CR1 and 1A3CR3 (TERM 10) as indicated.

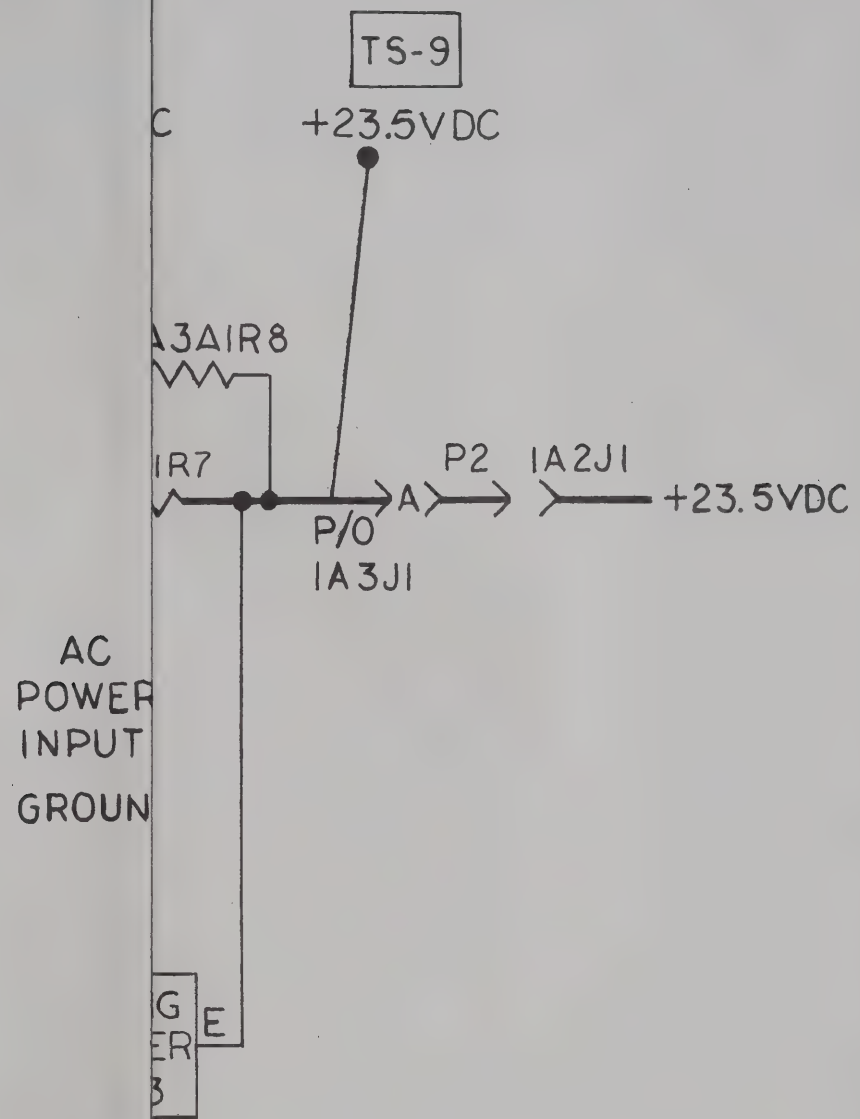
TS-5 Using multimeter measure dc voltage at base of voltage regulator 1A3A1Q1 as indicated.

TS-6 Using multimeter measure dc voltage at emitter of voltage regulator 1A3A1Q1 (TERM 5) as indicated.

TS-7 Using multimeter, measure dc voltage at emitter of dc amplifier 1A3A1Q2 (TERM 6) as indicated.

TS-8 Using multimeter measure dc voltage at emitter of output amplifier 1A3Q1 (TERM 1) or 1A3Q2 (TERM 2) as indicated.

TS-9 Using multimeter measure dc voltage at emitter of sensing amplifier 1A3A1Q3 (TERM 3) as indicated.



23.5 VDC Power Distribution, Antenna Coupler

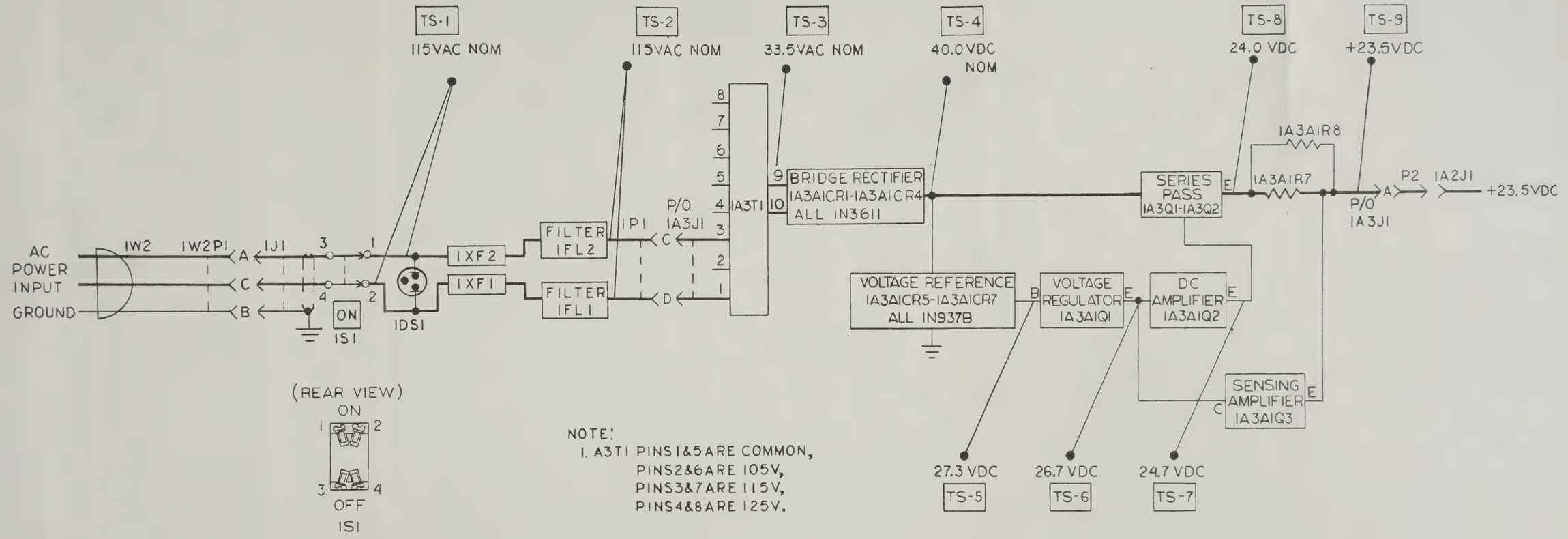


Figure 5-2. AC and +23.5 VDC Power Distribution, Antenna Coupler

NOTES FOR FIGURE 5-3

GENERAL NOTES

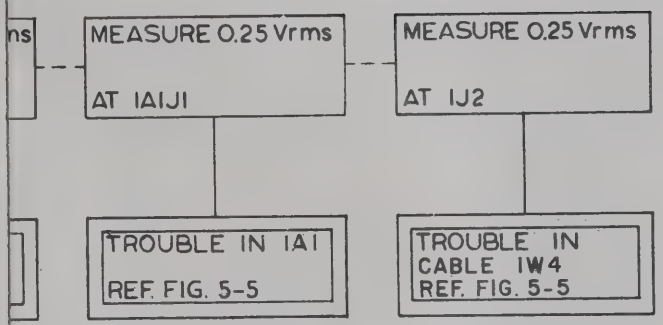
A. TEST SETUP:
REFER TO RF SIGNAL FLOW DIAGRAM, FIGURE 5-1.

B. REFER TO SCHEMATIC DIAGRAMS, FIGURE 5-5, 5-6 AND 5-8 OR 5-7 AND 5-9.

C. LEGEND:

YES _____

NO _ _ _ _ _ _ _ _ _



Signal Fault Logic Diagram, Antenna Coupler

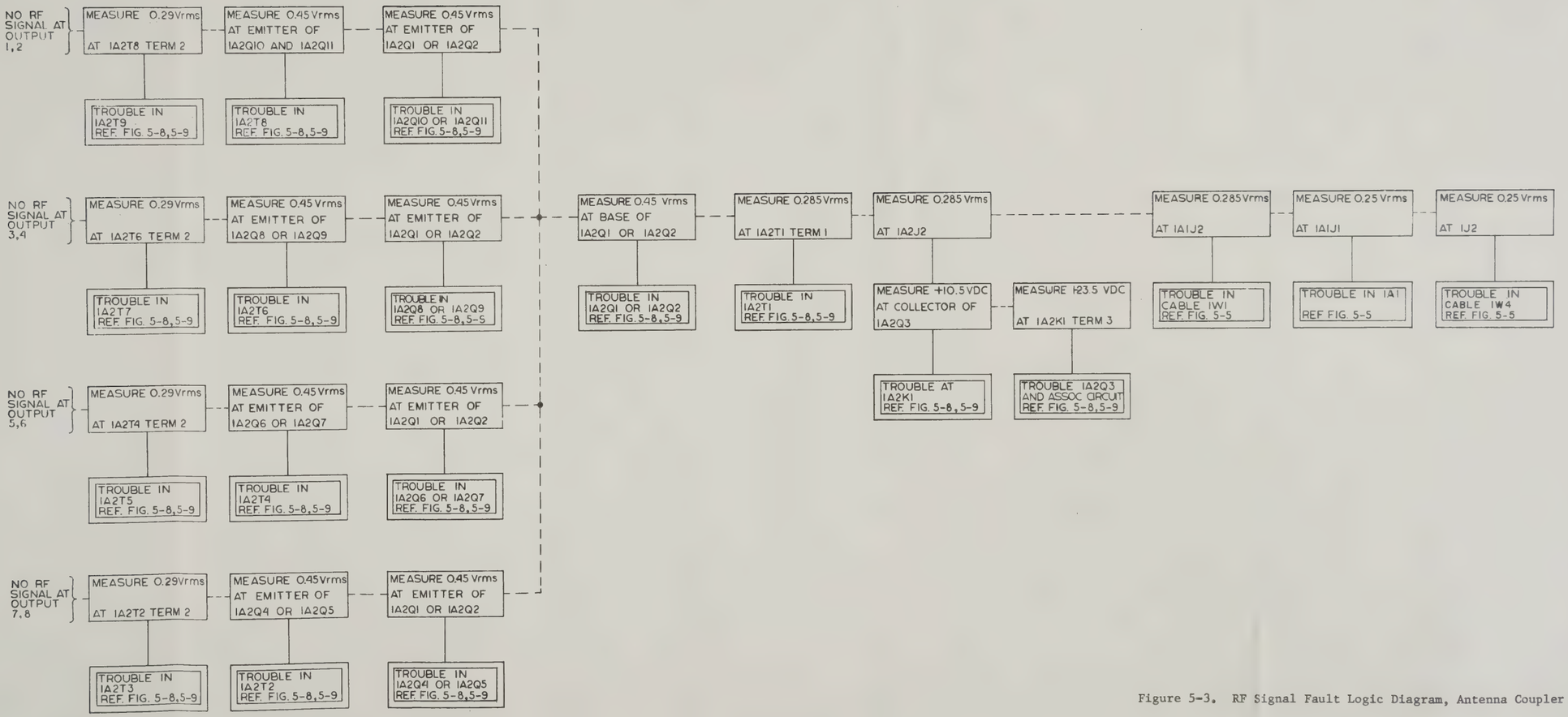

NO RF SIGNAL AT OUTPUT 1,2
MEASURE 0.29Vrms AT 1A2T8 TERM 2
MEASURE 0.45Vrms AT EMITTER OF 1A2Q10 AND 1A2Q11
MEASURE 0.45Vrms AT EMITTER OF 1A2Q1 OR 1A2Q2
TROUBLE IN 1A2T9 REF. FIG. 5-8,5-9
TROUBLE IN 1A2T8 REF. FIG. 5-8,5-9
TROUBLE IN 1A2Q10 OR 1A2Q11 REF. FIG. 5-8,5-9
NO RF SIGNAL AT OUTPUT 3,4
MEASURE 0.29Vrms AT 1A2T6 TERM 2
MEASURE 0.45Vrms AT EMITTER OF 1A2Q8 OR 1A2Q9
MEASURE 0.45Vrms AT EMITTER OF 1A2Q1 OR 1A2Q2
TROUBLE IN 1A2T7 REF. FIG. 5-8,5-9
TROUBLE IN 1A2T6 REF. FIG. 5-8,5-9
TROUBLE IN 1A2Q8 OR 1A2Q9 REF. FIG. 5-8,5-9
NO RF SIGNAL AT OUTPUT 5,6
MEASURE 0.29Vrms AT 1A2T4 TERM 2
MEASURE 0.45Vrms AT EMITTER OF 1A2Q6 OR 1A2Q7
MEASURE 0.45Vrms AT EMITTER OF 1A2Q1 OR 1A2Q2
TROUBLE IN 1A2T5 REF. FIG. 5-8,5-9
TROUBLE IN 1A2T4 REF. FIG. 5-8,5-9
TROUBLE IN 1A2Q6 OR 1A2Q7 REF. FIG. 5-8,5-9
NO RF SIGNAL AT OUTPUT 7,8
MEASURE 0.29Vrms AT 1A2T2 TERM 2
MEASURE 0.45Vrms AT EMITTER OF 1A2Q4 OR 1A2Q5
MEASURE 0.45Vrms AT EMITTER OF 1A2Q1 OR 1A2Q2
TROUBLE IN 1A2T3 REF. FIG. 5-8,5-9
TROUBLE IN 1A2T2 REF. FIG. 5-8,5-9
TROUBLE IN 1A2Q4 OR 1A2Q5 REF. FIG. 5-8,5-9
MEASURE 0.45 Vrms AT BASE OF 1A2Q1 OR 1A2Q2
MEASURE 0.285Vrms AT 1A2T1 TERM 1
MEASURE 0.285Vrms AT 1A2J2
MEASURE 0.285Vrms AT 1A1J2
MEASURE 0.25Vrms AT 1A1J1
MEASURE 0.25Vrms AT 1J2
TROUBLE IN 1A2Q1 OR 1A2Q2 REF. FIG. 5-8,5-9
TROUBLE IN 1A2T1 REF. FIG. 5-8,5-9
MEASURE +10.5VDC AT COLLECTOR OF 1A2Q3
MEASURE 123.5 VDC AT 1A2K1 TERM 3
TROUBLE IN CABLE 1W1 REF. FIG. 5-5
TROUBLE IN 1A1 REF FIG. 5-5
TROUBLE IN CABLE 1W4 REF. FIG. 5-5
TROUBLE AT 1A2K1 REF. FIG. 5-8,5-9
TROUBLE 1A2Q3 AND ASSOC CIRCUIT REF. FIG. 5-8,5-9

Figure 5-3. RF Signal Fault Logic Diagram, Antenna Coupler

NOTES FOR FIGURE 5-4

GENERAL NOTES

A. TEST SETUP:
REFER TO POWER DISTRIBUTION DIAGRAM, FIGURE 5-2.

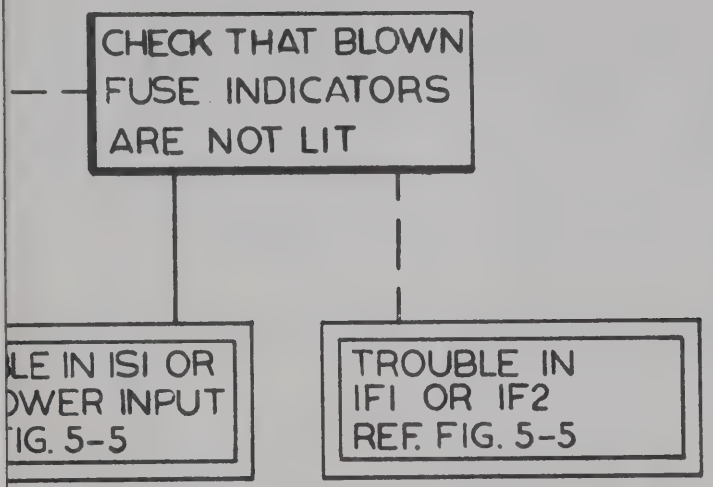
B. REFER TO SCHEMATIC DIAGRAM FIGURES 5-5 AND 5-10.

C. REFER TO FIGURE 7-6 FOR LOCATION OF TEST POINTS.

D. LEGEND:

YES _____

NO _ _ _ _ _ _ _ _



-4. Power Distribution Fault Logic Diagram

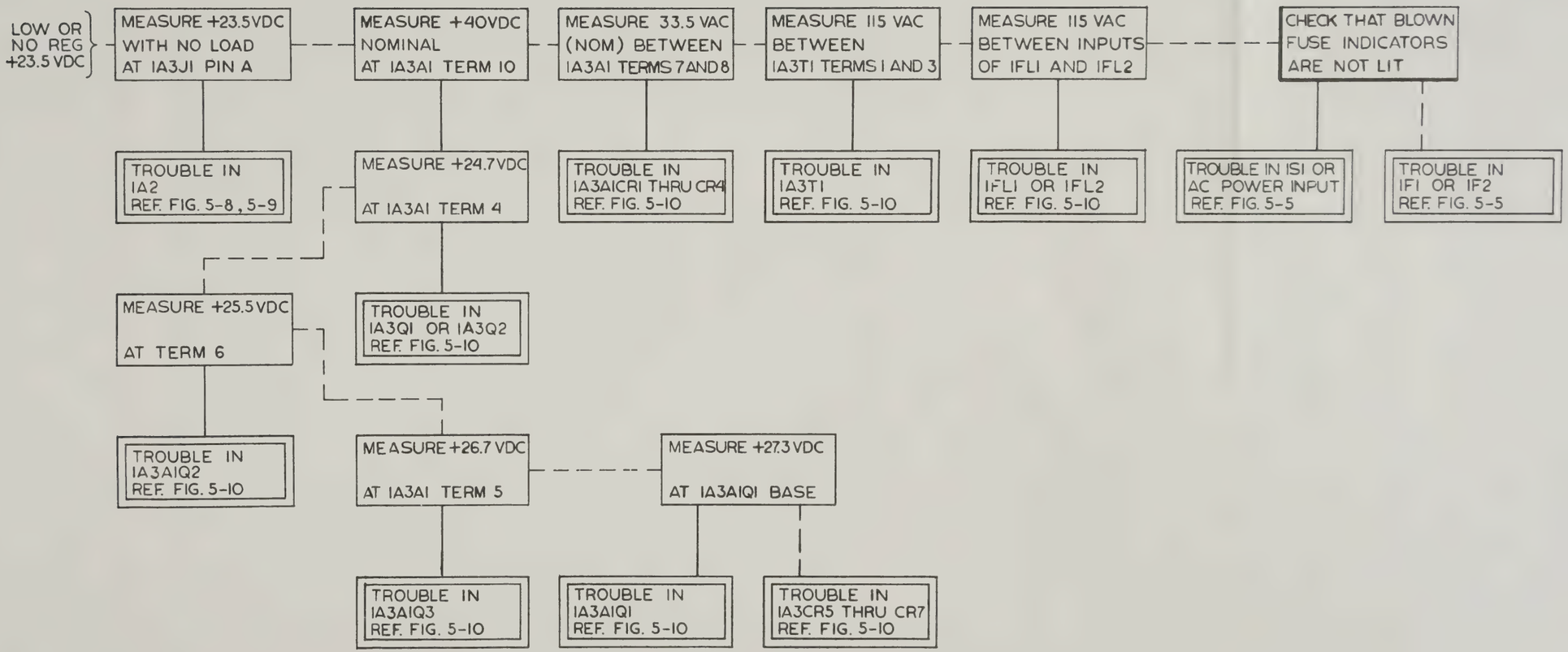

LOW OR NO REG +23.5 VDC
MEASURE +23.5VDC WITH NO LOAD AT 1A3J1 PIN A
MEASURE +40VDC NOMINAL AT 1A3A1 TERM 10
MEASURE 33.5 VAC (NOM) BETWEEN 1A3A1 TERMS 7 AND 8
MEASURE 115 VAC BETWEEN 1A3T1 TERMS 1 AND 3
MEASURE 115 VAC BETWEEN INPUTS OF 1FL1 AND 1FL2
CHECK THAT BLOWN FUSE INDICATORS ARE NOT LIT
TROUBLE IN 1A2 REF. FIG. 5-8, 5-9
MEASURE +24.7VDC AT 1A3A1 TERM 4
TROUBLE IN 1A3A1CR1 THRU CR4 REF. FIG. 5-10
TROUBLE IN 1A3T1 REF. FIG. 5-10
TROUBLE IN 1FL1 OR 1FL2 REF. FIG. 5-10
TROUBLE IN ISI OR AC POWER INPUT REF. FIG. 5-5
TROUBLE IN 1F1 OR 1F2 REF. FIG. 5-5
MEASURE +25.5VDC AT TERM 6
TROUBLE IN 1A3Q1 OR 1A3Q2 REF. FIG. 5-10
TROUBLE IN 1A3A1Q2 REF. FIG. 5-10
MEASURE +26.7 VDC AT 1A3A1 TERM 5
MEASURE +27.3 VDC AT 1A3A1Q1 BASE
TROUBLE IN 1A3A1Q3 REF. FIG. 5-10
TROUBLE IN 1A3A1Q1 REF. FIG. 5-10
TROUBLE IN 1A3CR5 THRU CR7 REF. FIG. 5-10

Figure 5-4. Power Distribution Fault Logic Diagram

NOTES FOR FIGURE 5-5

GENERAL NOTES

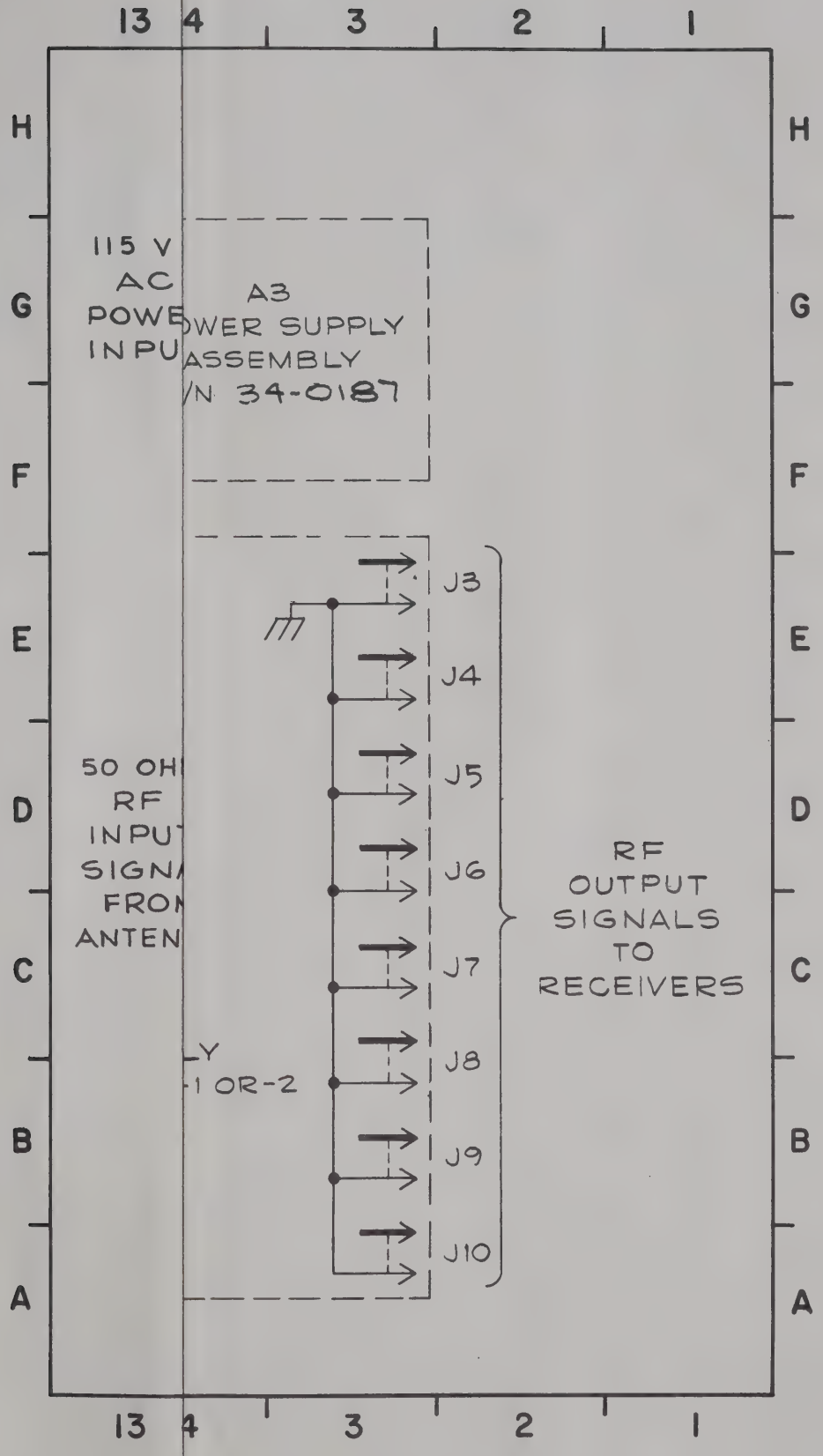
A. ALL RESISTANCE VALUES IN OHMS, UNLESS OTHERWISE NOTED.

B. E1 IS A GAS-FILLED SURGE VOLTAGE PROTECTOR.

C. RF FILTER IS NOT REPAIRABLE AND SHOULD BE REPLACED AS A UNIT IF DEFECTIVE. REFER TO FIGURE 3-2 FOR CORRECT ATTENUATION VERSUS FREQUENCY CHARACTERISTIC MEASURED WITH OUTPUT OF FILTER TERMINATED BY DIVIDER ASSEMBLY 1A2. CURVES SHOWN ARE TAKEN AT OUTPUT JACKS J3 TO J10 AND INCLUDES THE NOMINAL 1-3 DB GAIN OF THE DIVIDER ASSEMBLY.

D. PARTS LOCATION INDEX.

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A1	9C	1A3	4G	1S1	10H
1A1J1	10D	1A3J1	5G	1W1	6D
1A1J2	8D	1DS1	9G	1W1P1	6D
1A2	5C	1E1	11C	1W1P2	7D
1A2J1	5F	1F1	7G	1W2	12H
1A2J2	5D	1F2	8H	1W2P1	12G
1A2J3	3E	1F3	8E	1W2P2	7D
1A2J4	3E	1FL1	7G	1W3	10H
1A2J5	3D	1FL2	7G	1W4	11D
1A2J6	3D	1J1	11G	1XDS1	9G
1A2J7	3C	1J2	12D	1XF1	8G
1A2J8	3C	1P1	12G	1XF2	8G
1A2J9	3B	1P2	11G	1XF3	8E
1A2J10	3A	1P3	10D		



ntenna Coupler, Maintenance Schematic Diagram

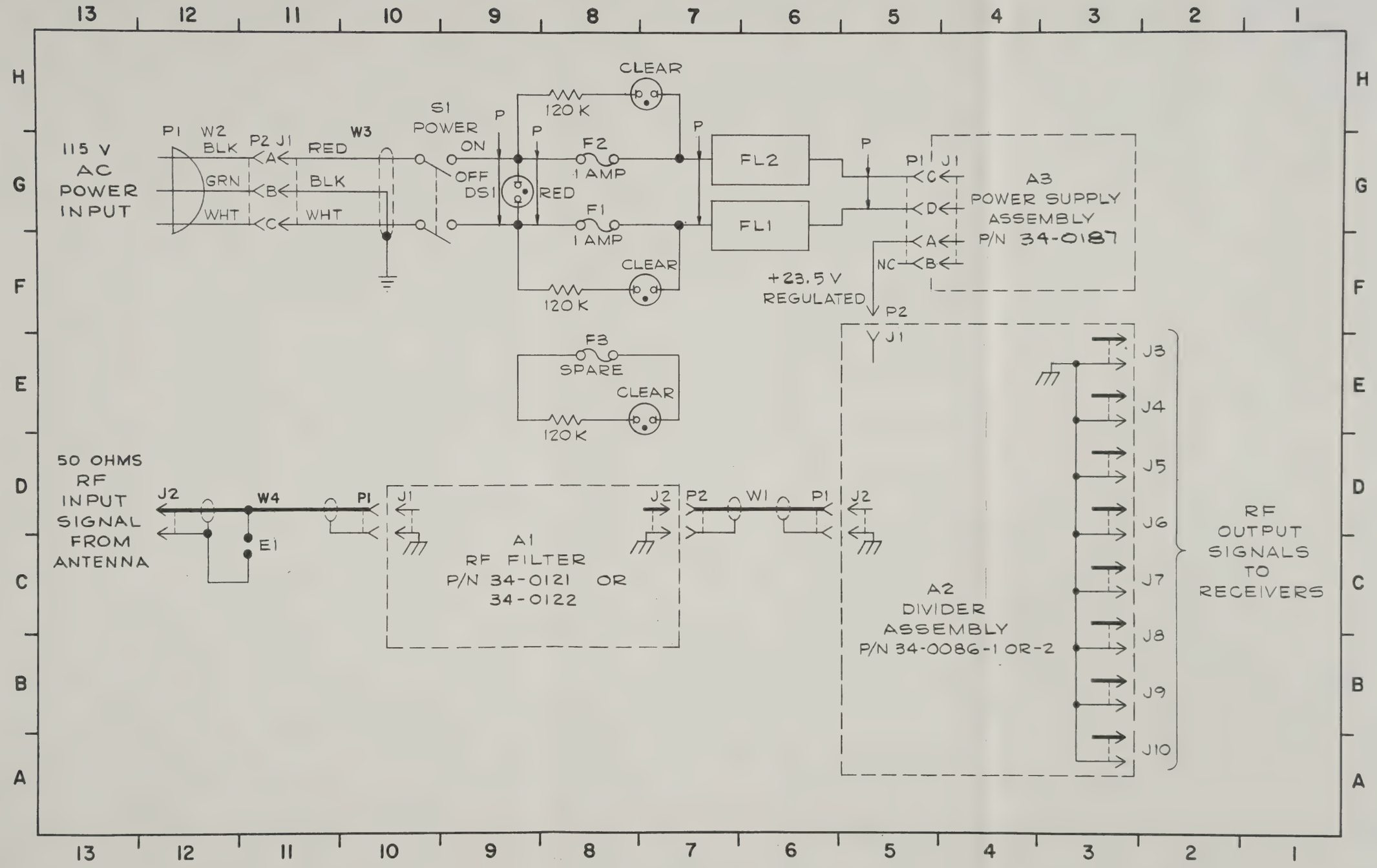


Figure 5-5. Antenna Coupler, Maintenance Schematic Diagram

NOTES FOR FIGURE 5-6

GENERAL NOTES

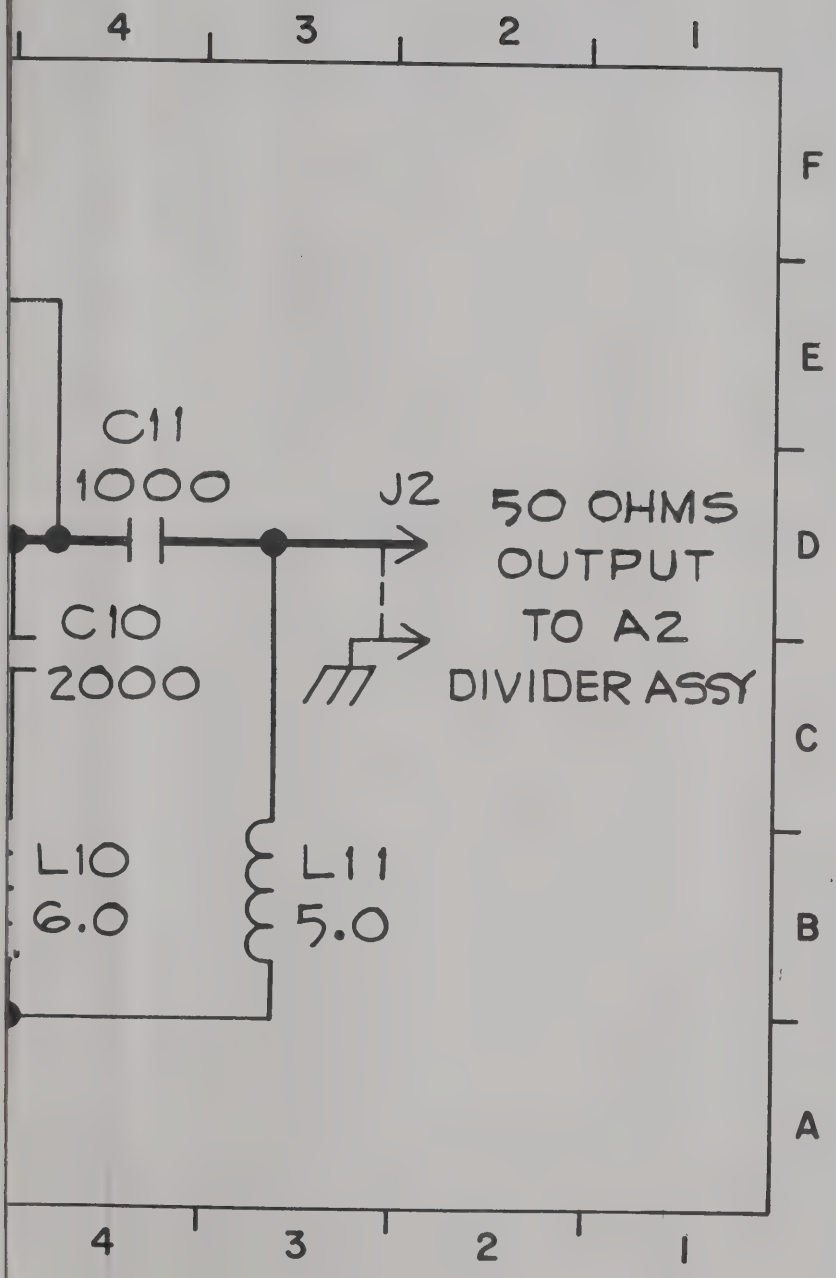
A. THIS RF FILTER IS USED ON CU-1382F/FRR.

B. ALL CAPACITANCE VALUES IN PICOFARADS.

C. ALL INDUCTANCE VALUES IN MICROHENRIES.

D. PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A1C1	12C	1A1C9	5D	1A1L4	11B
1A1C2	11C	1A1C10	4D	1A1L5	11D
1A1C3	10C	1A1C11	4D	1A1L6	10B
1A1C4	8D	1A1J1	14D	1A1L7	10D
1A1C5	7C	1A1J2	3D	1A1L8	7B
1A1C6	7D	1A1L1	14D	1A1L9	6B
1A1C7	6C	1A1L2	12B	1A1L10	5B
1A1C8	5F	1A1L3	12D	1A1L11	3B



ter, 1A1, 34-0121, Maintenance Schematic Diagram

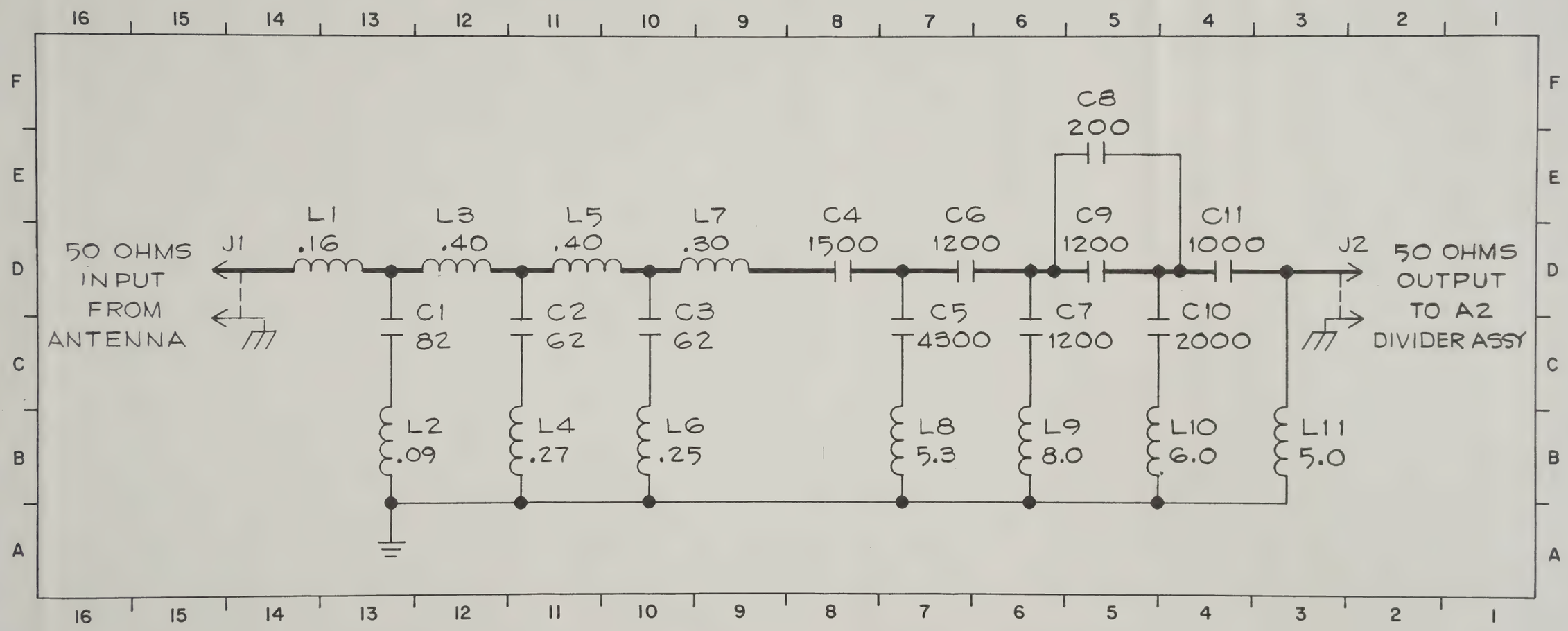


Figure 5-6. RF Filter, 1A1, 34-0121, Maintenance Schematic Diagram

NOTES FOR FIGURE 5-7

GENERAL NOTES

A. THIS RF FILTER IS USED ON CU-1382G/FRR.

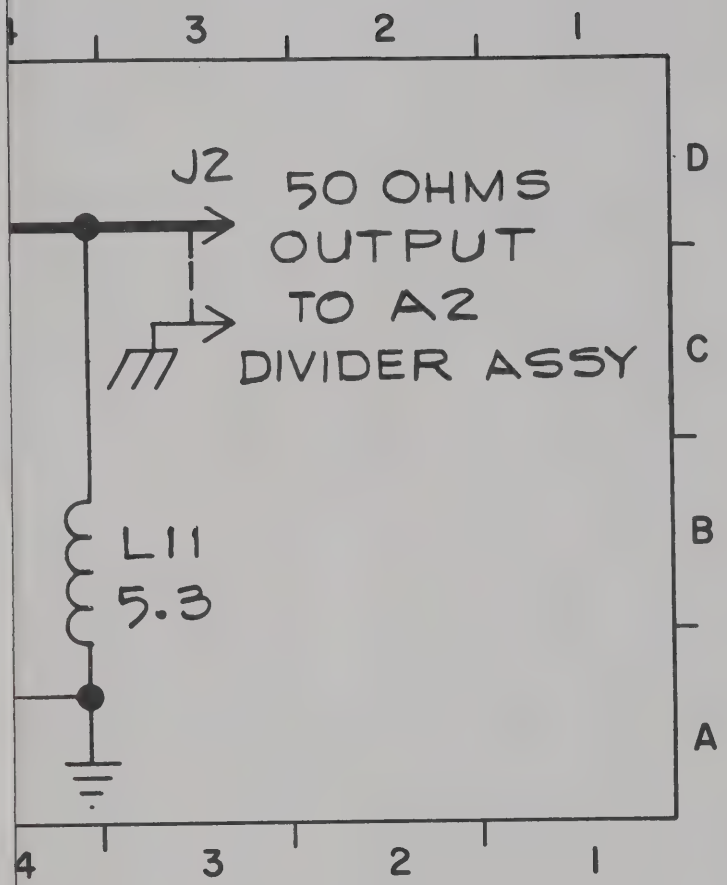
B. ALL CAPACITANCE VALUES IN PICOFARADS.

C. ALL INDUCTANCE VALUES IN MICROHENRIES.

D. PARTS LOCATION INDEX.

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A1C1	12C	1A1C9	6D	1A1L4	11B
1A1C2	11C	1A1C10	5C	1A1L5	10D
1A1C3	10C	1A1C11*		1A1L6*	
1A1C4	9C	1A1J1	14D	1A1L7*	
1A1C5	8C	1A1J2	3D	1A1L8	8B
1A1C6	7D	1A1L1	13D	1A1L9	6B
1A1C7	6C	1A1L2	12B	1A1L10*	
1A1C8*		1A1L3	12D	1A1L11	3B

*Not Used



1A1, 34-0122, Maintenance Schematic Diagram

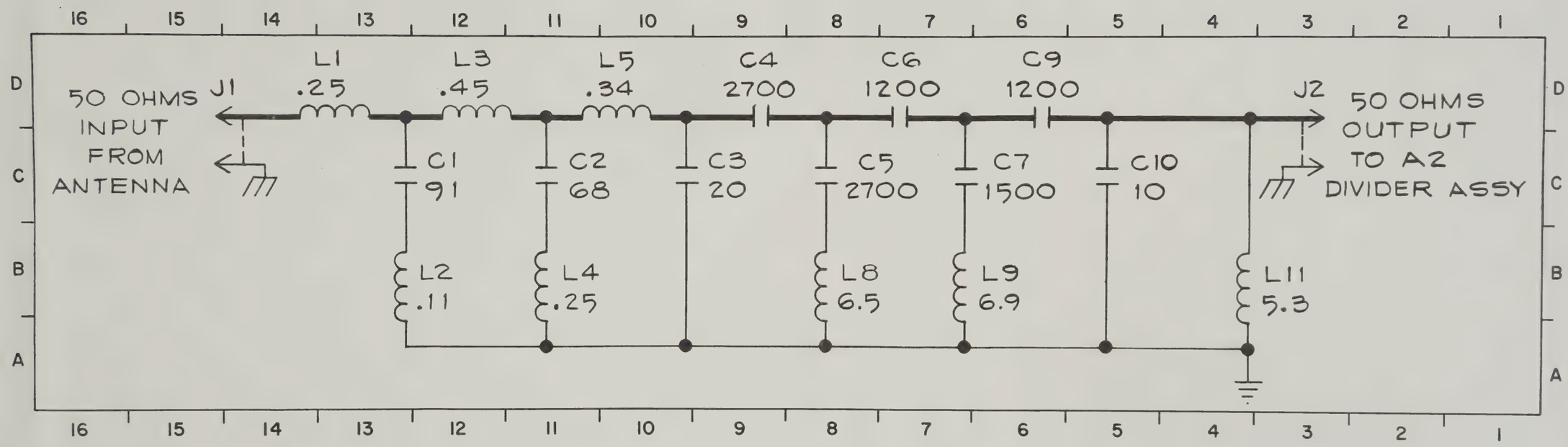


Figure 5-7. RF Filter, 1A1, 34-0122, Maintenance Schematic Diagram

NOTES FOR FIGURE 5-8

GENERAL NOTES

A. THIS DIVIDER ASSEMBLY IS USED ON CU-1382F/FRR.

B. REMOVE HEATSINK PER FIGURE 5-11.

C. ALL RESISTANCE VALUES IN OHMS, UNLESS OTHERWISE NOTED.

D. ALL CAPACITANCE VALUES IN MICROFARADS, UNLESS OTHERWISE NOTED.

E. ALL INDUCTANCE VALUES IN MICROHENRIES, UNLESS OTHERWISE NOTED.

F. DENOTE FERRITE BEADS.

G. COMPLETE FOLLOWING TABLE FOR SELECTED CAPACITORS.

REF DESIG	NOMINAL VALUE	ACTUAL VALUE
C5	6 MFD	
C6	1.5 PF	
C7	1.5 PF	

NOTES FOR FIGURE 5-8 (Cont)

VOLTAGE MEASUREMENTS

TEST POINT	VOLTAGE	TEST POINT	VOLTAGE
1A2Q1 - E	9.2V	1A2Q7 - E	8.7V
1A2Q1 - B	10.0V	1A2Q7 - B	9.2V
1A2Q1 - C	23.5V	1A2Q7 - C	23.5V
1A2Q2 - E	9.2V	1A2Q8 - E	8.7V
1A2Q2 - B	10.0V	1A2Q8 - B	9.2V
1A2Q2 - C	23.5V	1A2Q8 - C	23.5V
1A2Q3 - E	5.3V	1A2Q9 - E	8.7V
1A2Q3 - B	5.9V	1A2Q9 - B	9.2V
1A2Q3 - C	10.5V	1A2Q9 - C	23.5V
1A2Q4 - E	8.7V	1A2Q10 - E	8.7V
1A2Q4 - B	9.2V	1A2Q10 - B	9.2V
1A2Q4 - C	23.5V	1A2Q10 - C	23.5V
1A2Q5 - E	8.7V	1A2Q11 - E	8.7V
1A2Q5 - B	9.2V	1A2Q11 - B	9.2V
1A2Q5 - C	23.5V	1A2Q11 - C	23.5V
1A2Q6 - E	8.7V		
1A2Q6 - B	9.2V		
1A2Q6 - C	23.5V		

NOTES:

1 VOLTAGE MEASUREMENTS TAKEN TO GROUND WITH MULTIMETER AN/USM-311.

2 VOLTAGE TOL. $\pm$ 5%.

NOTES FOR FIGURE 5-8 (Cont)

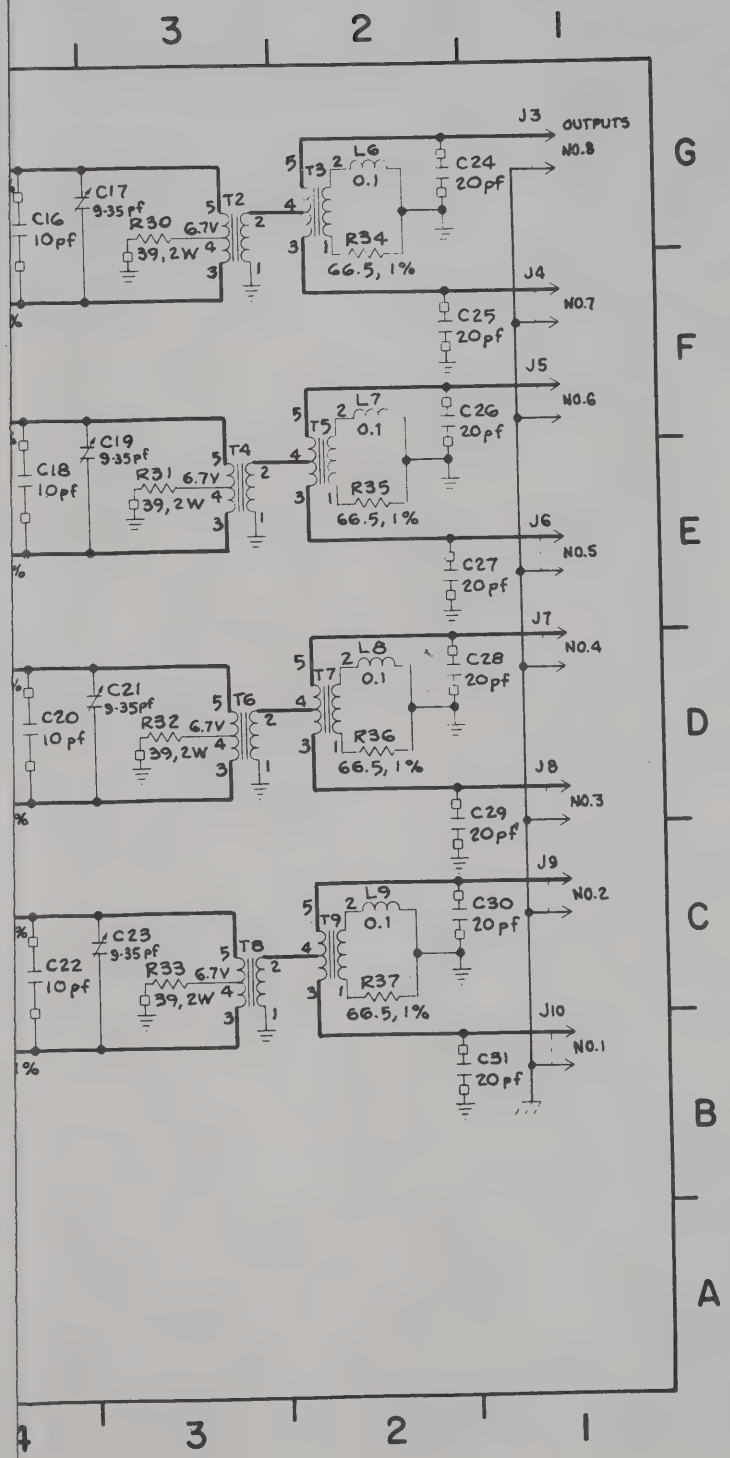
PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A2C1	8G	1A2C25	2F	1A2L4	6E
1A2C2	8G	1A2C26	2F	1A2L5	6D
1A2C3	9E	1A2C27	2E	1A2L6	2G
1A2C4	9E	1A2C28	2D	1A2L7	2F
1A2C5	8E	1A2C29	2D	1A2L8	2F
1A2C6	7E	1A2C30	2C	1A2L9	2D
1A2C7	7D	1A2C31	2C	1A2Q1	7E
1A2C8	7D	1A2CR1	9B	1A2Q2	7D
1A2C9	7B	1A2CR2	9B	1A2Q3	8B
1A2C10	9A	1A2CR3	8A	1A2Q4	5G
1A2C11	9A	1A2J1	8A	1A2Q5	5G
1A2C12	5G	1A2J2	9C	1A2Q6	5F
1A2C13	5E	1A2J3	2G	1A2Q7	5E
1A2C14	5D	1A2J4	2F	1A2Q8	5D
1A2C15	5C	1A2J5	2F	1A2Q9	5D
1A2C16	4G	1A2J6	2E	1A2Q10	5C
1A2C17	3G	1A2J7	2E	1A2Q11	5C
1A2C18	4E	1A2J8	2D	1A2R1	8F
1A2C19	4E	1A2J9	2C	1A2R2	8F
1A2C20	4D	1A2J10	2C	1A2R3	8E
1A2C21	4D	1A2K1	8B	1A2R4	8D
1A2C22	4C	1A2L1	8F	1A2R5	8C
1A2C23	4C	1A2L2	8E	1A2R6	8B
1A2C24	2G	1A2L3	8E	1A2R7	8B

NOTES FOR FIGURE 5-8 (Cont)

PARTS LOCATION INDEX (Cont)

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A2R8	8A	1A2R21	6C	1A2R34	2G
1A2R9	7A	1A2R22	4G	1A2R35	2E
1A2R10	7F	1A2R23	4G	1A2R36	2D
1A2R11	7E	1A2R24	4F	1A2R37	2C
1A2R12	7D	1A2R25	4E	1A2T1	9E
1A2R13	7C	1A2R26	4E	1A2T2	2G
1A2R14	6G	1A2R27	4D	1A2T3	2G
1A2R15	6F	1A2R28	4C	1A2T4	3E
1A2R16	6G	1A2R29	4B	1A2T5	3E
1A2R17	6E	1A2R30	3G	1A2T6	3D
1A2R18	6E	1A2R31	3E	1A2T7	3D
1A2R19	6D	1A2R32	3D	1A2T8	3C
1A2R20	6C	1A2R33	3C	1A2T9	3C



ly, 1A2, 34-0086-1 Maintenance Schematic Diagram

NOTES FOR FIGURE 5-8 (Cont)

PARTS LOCATION INDEX (Cont)

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A2R8	8A	1A2R21	6C	1A2R34	2G
1A2R9	7A	1A2R22	4G	1A2R35	2E
1A2R10	7F	1A2R23	4G	1A2R36	2D
1A2R11	7E	1A2R24	4F	1A2R37	2C
1A2R12	7D	1A2R25	4E	1A2T1	9E
1A2R13	7C	1A2R26	4E	1A2T2	2G
1A2R14	6G	1A2R27	4D	1A2T3	2G
1A2R15	6F	1A2R28	4C	1A2T4	3E
1A2R16	6G	1A2R29	4B	1A2T5	3E
1A2R17	6E	1A2R30	3G	1A2T6	3D
1A2R18	6E	1A2R31	3E	1A2T7	3D
1A2R19	6D	1A2R32	3D	1A2T8	3C
1A2R20	6C	1A2R33	3C	1A2T9	3C

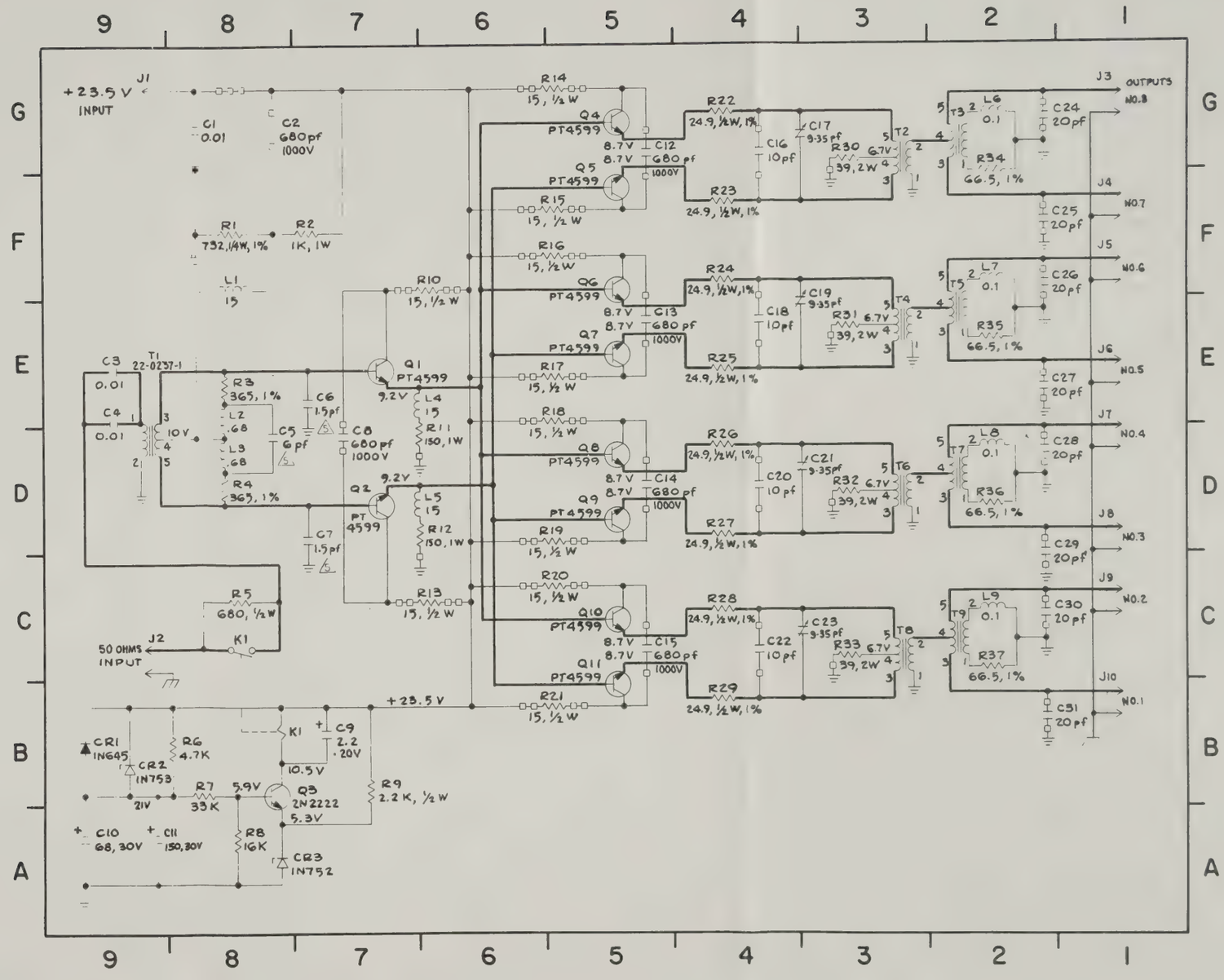


Figure 5-8. Divider Assembly, 1A2, 34-0086-1 Maintenance Schematic Diagram

NOTES FOR FIGURE 5-9

GENERAL NOTES

A. THIS DIVIDER ASSEMBLY IS USED ON CU-1382G/FRR.

B. REMOVE HEATSINK PER FIGURE 5-11.

C. ALL RESISTANCE VALUES IN OHMS, UNLESS OTHERWISE NOTED.

D. ALL CAPACITANCE VALUES IN MICROFARADS, UNLESS OTHERWISE NOTED.

E. ALL INDUCTANCE VALUES IN MICROHENRIES, UNLESS OTHERWISE NOTED.

F. DENOTE FERRITE BEADS.

G. COMPLETE FOLLOWING TABLE FOR SELECTED CAPACITORS.

REF DESIG	NOMINAL VALUE	ACTUAL VALUE
C5	6 MFD	
C6	1.5 PF	
C7	1.5 PF	

NOTES FOR FIGURE 5-9 (Cont)

VOLTAGE MEASUREMENTS

TEST POINT	VOLTAGE	TEST POINT	VOLTAGE
1A2Q1 - E	9.2V	1A2Q7 - E	8.7V
1A2Q1 - B	10.0V	1A2Q7 - B	9.2V
1A2Q1 - C	23.5V	1A2Q7 - C	23.5V
1A2Q2 - E	9.2V	1A2Q8 - E	8.7V
1A2Q2 - B	10.0V	1A2Q8 - B	9.2V
1A2Q2 - C	23.5V	1A2Q8 - C	23.5V
1A2Q3 - E	5.3V	1A2Q9 - E	8.7V
1A2Q3 - B	5.9V	1A2Q9 - B	9.2V
1A2Q3 - C	10.5V	1A2Q9 - C	23.5V
1A2Q4 - E	8.7V	1A2Q10 - E	8.7V
1A2Q4 - B	9.2V	1A2Q10 - B	9.2V
1A2Q4 - C	23.5V	1A2Q10 - C	23.5V
1A2Q5 - E	8.7V	1A2Q11 - E	8.7V
1A2Q5 - B	9.2V	1A2Q11 - B	9.2V
1A2Q5 - C	23.5V	1A2Q11 - C	23.5V
1A2Q6 - E	8.7V		
1A2Q6 - B	9.2V		
1A2Q6 - C	23.5V		

NOTES:

1 VOLTAGE MEASUREMENTS TAKEN TO GROUND WITH MULTIMETER AN/USM-311.

2 VOLTAGE TOL. $\pm$ 5%.

NOTES FOR FIGURE 5-9 (Cont)

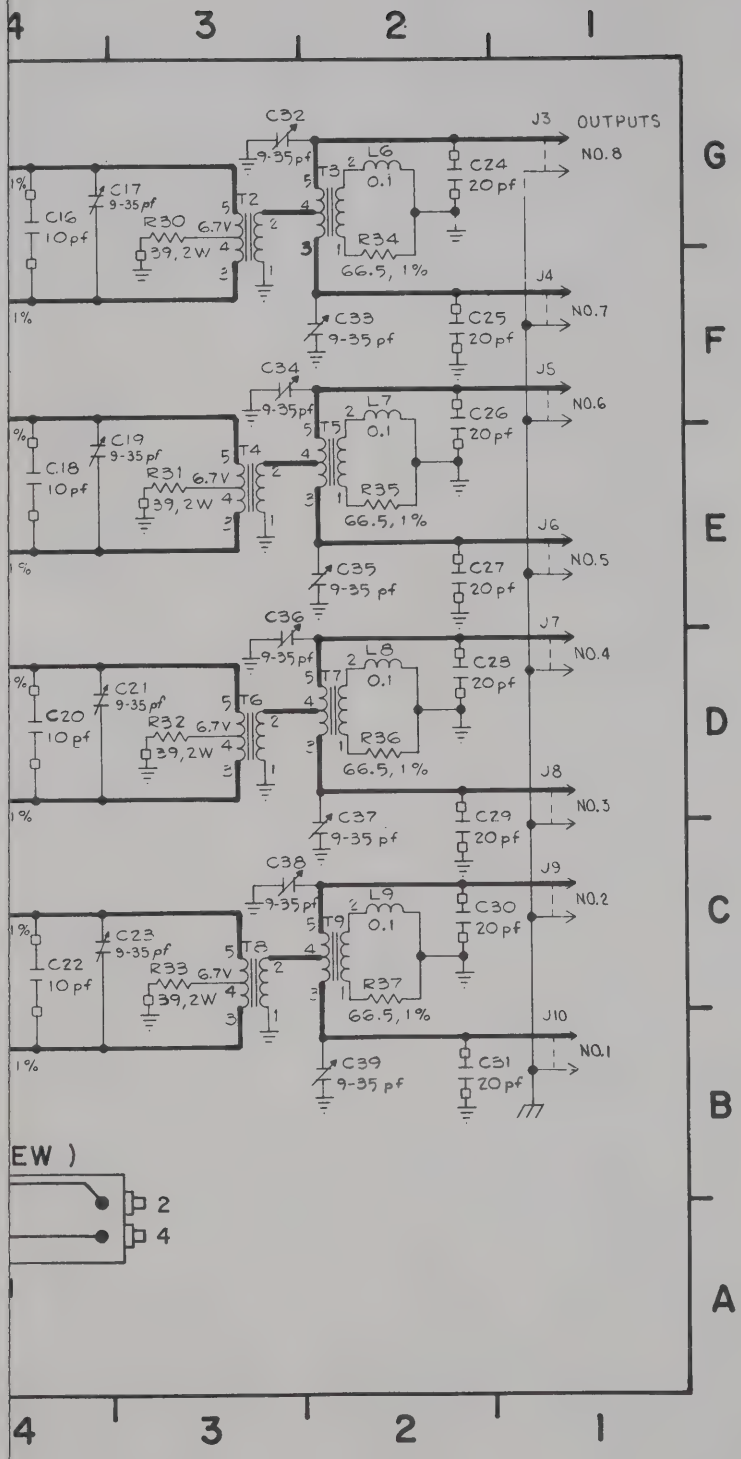
PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A2C1	8G	1A2C25	2F	1A2J7	2E
1A2C2	8G	1A2C26	2F	1A2J8	2D
1A2C3	9E	1A2C27	2E	1A2J9	2C
1A2C4	9E	1A2C28	2D	1A2J10	2C
1A2C5	8E	1A2C29	2D	1A2K1	8B
1A2C6	8E	1A2C30	2C	1A2L1	8F
1A2C7	7D	1A2C31	2B	1A2L2	8E
1A2C8	7E	1A2C32	3G	1A2L3	8C
1A2C9	8B	1A2C33	3F	1A2L4	7E
1A2C10	9A	1A2C34	3F	1A2L5	7D
1A2C11	9A	1A2C35	2E	1A2L6	2G
1A2C12	5G	1A2C36	3D	1A2L7	2F
1A2C13	5E	1A2C37	2D	1A2L8	2D
1A2C14	5D	1A2C38	3C	1A2L9	2C
1A2C15	5C	1A2C39	2B	1A2Q1	7E
1A2C16	4G	1A2CR1	8F	1A2Q2	7D
1A2C17	4G	1A2CR2	9B	1A2Q3	7B
1A2C18	4E	1A2CR3	8A	1A2Q4	5G
1A2C19	4E	1A2J1	9G	1A2Q5	5G
1A2C20	4D	1A2J2	9C	1A2Q6	5F
1A2C21	4D	1A2J3	2G	1A2Q7	5E
1A2C22	4C	1A2J4	2F	1A2Q8	5D
1A2C23	4C	1A2J5	2E	1A2Q9	5D
1A2C24	2G	1A2J6	2E	1A2Q10	5C

NOTES FOR FIGURE 5-9 (Cont)

PARTS LOCATION INDEX (Cont)

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A2Q11	5C	1A2R16	6F	1A2R32	3D
1A2R1	8F	1A2R17	6E	1A2R33	3C
1A2R2	8F	1A2R18	5E	1A2R34	2G
1A2R3	8E	1A2R19	6D	1A2R35	2E
1A2R4	8D	1A2R20	6C	1A2R36	2D
1A2R5	8C	1A2R21	6C	1A2R37	2C
1A2R6	8B	1A2R22	4G	1A2T1	9E
1A2R7	8B	1A2R23	4F	1A2T2	3G
1A2R8	8A	1A2R24	4F	1A2T3	2G
1A2R9	7B	1A2R25	4E	1A2T4	3E
1A2R10	7F	1A2R26	4D	1A2T5	2F
1A2R11	7D	1A2R27	4D	1A2T6	3D
1A2R12	7D	1A2R28	4C	1A2T7	2D
1A2R13	7C	1A2R29	$b	1A2T8	3C
1A2R14	6G	1A2R30	3G	1A2T9	2C
1A2R15	6F	1A2R31	3E		



1A2, 34-0086-2, Maintenance Schematic Diagram

NOTES FOR FIGURE 5-9 (Cont)

PARTS LOCATION INDEX (Cont)

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A2Q11	5C	1A2R16	6F	1A2R32	3D
1A2R1	8F	1A2R17	6E	1A2R33	3C
1A2R2	8F	1A2R18	5E	1A2R34	2G
1A2R3	8E	1A2R19	6D	1A2R35	2E
1A2R4	8D	1A2R20	6C	1A2R36	2D
1A2R5	8C	1A2R21	6C	1A2R37	2C
1A2R6	8B	1A2R22	4G	1A2T1	9E
1A2R7	8B	1A2R23	4F	1A2T2	3G
1A2R8	8A	1A2R24	4F	1A2T3	2G
1A2R9	7B	1A2R25	4E	1A2T4	3E
1A2R10	7F	1A2R26	4D	1A2T5	2F
1A2R11	7D	1A2R27	4D	1A2T6	3D
1A2R12	7D	1A2R28	4C	1A2T7	2D
1A2R13	7C	1A2R29	$b	1A2T8	3C
1A2R14	6G	1A2R30	3G	1A2T9	2C
1A2R15	6F	1A2R31	3E		

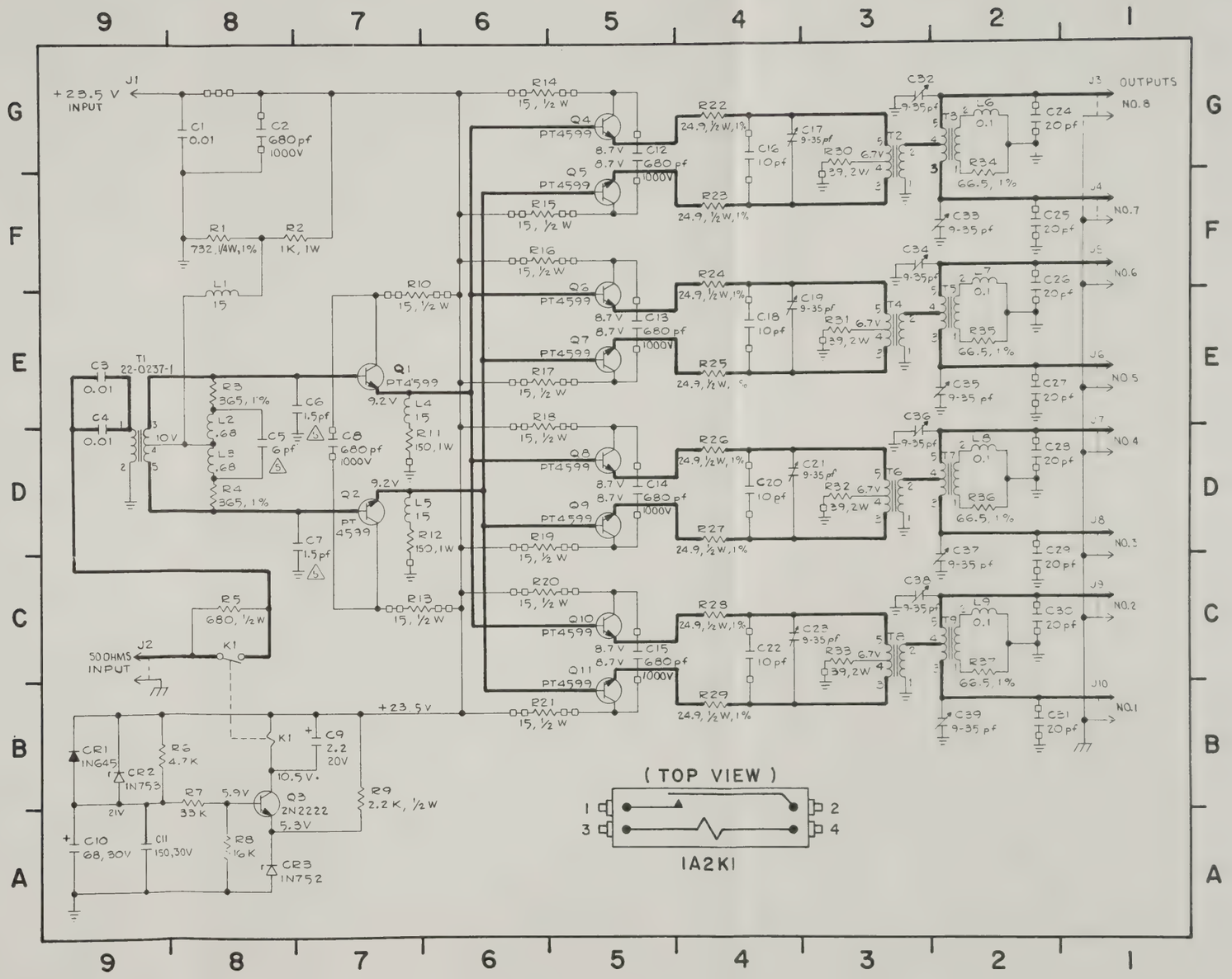


Figure 5-9. Divider Assembly, 1A2, 34-0086-2, Maintenance Schematic Diagram

NOTES FOR FIGURE 5-10

GENERAL NOTES

A. PREFIX EACH REFERENCE DESIGNATION WITH 1A3.

B. ALL RESISTANCE VALUES IN OHMS, UNLESS OTHERWISE NOTED.

C. ALL CAPACITANCE VALUES IN MICROFARADS, UNLESS OTHERWISE NOTED.

D. TRANSFORMER 1A3T1, SHOWN WIRED FOR 115 VOLT OPERATION. REFER TO CHAPTER 8 FOR WIRING REQUIRED FOR OTHER THAN 115 VOLT OPERATION.

E. SELECTED RESISTOR 1A3R12 HAS NOMINAL VALUE OF 750 OHMS, NOTE ACTUAL VALUE OHMS.

F. REFER TO FIGURE 7-6 FOR LOCATION OF TEST POINTS.

VOLTAGE MEASUREMENTS

TEST POINT	VOLTAGE	TEST POINT	VOLTAGE
1A3A1Q1 - E (TERM 5)	26.7V	1A3Q1 - E (TERM 1)	24.0V
1A3A1Q1 - B	27.3V	1A3Q1 - B (TERM 4)	24.7V
1A3A1Q1 - C	37.2V	1A3Q1 - C (TERM 10)	Approx 40V*
1A3A1Q2 - E (TERM 4)	24.7V	1A3Q2 - E (TERM 2)	24.0V
1A3A1Q2 - B (TERM 6)	25.5V	1A3Q2 - B (TERM 4)	24.7V
1A3A1Q2 - C	38.5V	1A3Q2 - C (TERM 10)	Approx 40V*
1A3A1Q3 - E (TERM 3)	23.5V	**1A3A1 - TERM 7 and	33.5VAC (NOM)
1A3A1Q3 - B	24.0V	TERM 8	
1A3A1Q3 - C (TERM 6)	25.5V	1A3A1 - TERM 9	0 V

NOTES:

1 VOLTAGE MEASUREMENTS TAKEN TO GROUND WITH MULTIMETER AN/USM-311.

2 VOLTAGE TOL. $\pm$ 5%.

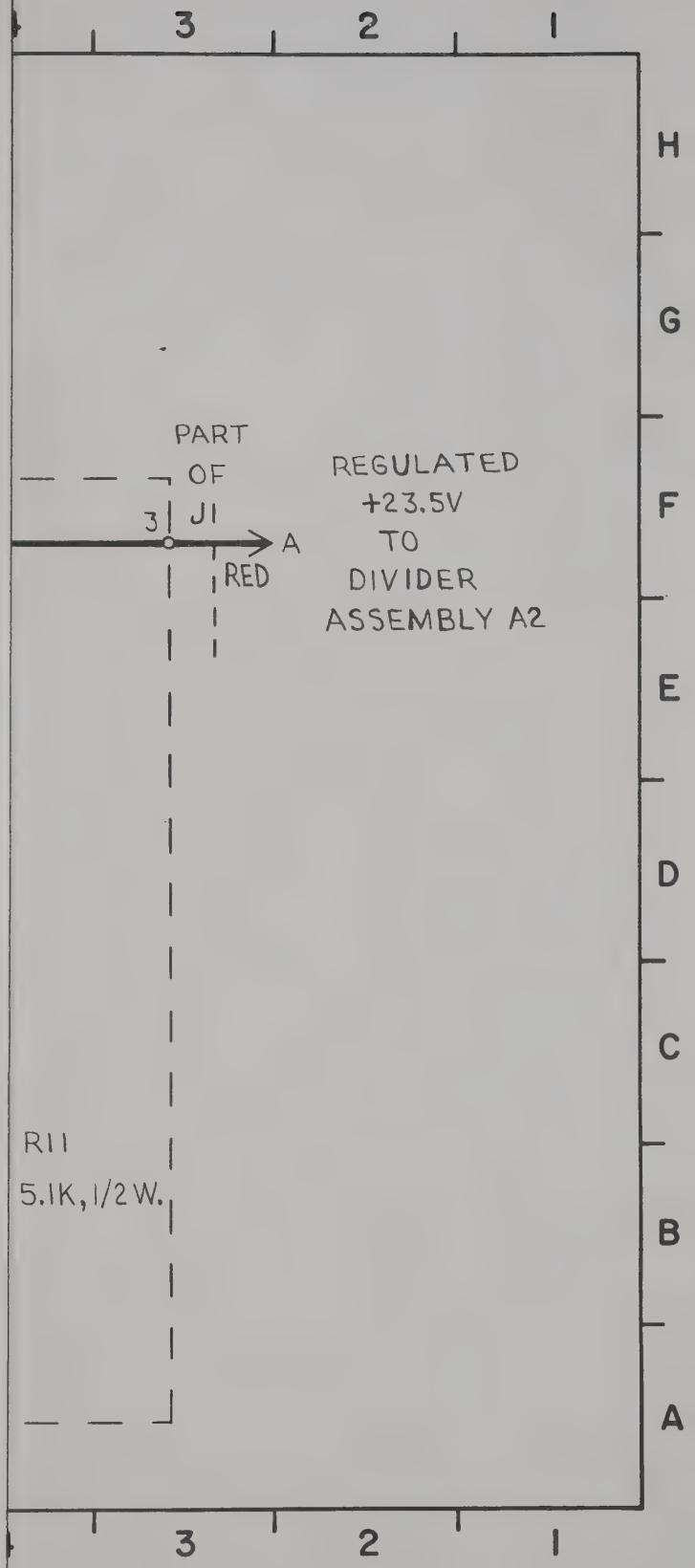
* VOLTAGE VARIES WITH LINE VOLTAGE.

** VOLTAGE MEASUREMENT TAKEN BETWEEN TERMINALS WITH MULTIMETER AN/USM-311.

NOTES FOR FIGURE 5-10 (Cont)

PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A3A1	5B	1A3A1Q1	7H	1A3A1R9	5D
1A3A1C1	13C	1A3A1Q2	6H	1A3A1R10	5D
1A3A1C2	7B	1A3A1Q3	5C	1A3A1R11	4B
1A3A1C3	5B	1A3A1R1	10E	1A3A1R12	8C
1A3A1CR1	12E	1A3A1R2	9E	1A3C1	10C
1A3A1CR2	11E	1A3A1R3	8F	1A3C2	11D
1A3A1CR3	12D	1A3A1R4	8C	1A3J1	3F
1A3A1CR4	11D	1A3A1R5	8C	1A3Q1	7H
1A3A1CR5	10D	1A3A1R6	7E	1A3Q2	6H
1A3A1CR6	10C	1A3A1R7	5F	1A3T1	14F
1A3A1CR7	10C	1A3A1R8	4E		



Supply, 1A3, Maintenance Schematic Diagram

NOTES FOR FIGURE 5-10 (Cont)

PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A3A1	5B	1A3A1Q1	7H	1A3A1R9	5D
1A3A1C1	13C	1A3A1Q2	6H	1A3A1R10	5D
1A3A1C2	7B	1A3A1Q3	5C	1A3A1R11	4B
1A3A1C3	5B	1A3A1R1	10E	1A3A1R12	8C
1A3A1CR1	12E	1A3A1R2	9E	1A3C1	10C
1A3A1CR2	11E	1A3A1R3	8F	1A3C2	11D
1A3A1CR3	12D	1A3A1R4	8C	1A3J1	3F
1A3A1CR4	11D	1A3A1R5	8C	1A3Q1	7H
1A3A1CR5	10D	1A3A1R6	7E	1A3Q2	6H
1A3A1CR6	10C	1A3A1R7	5F	1A3T1	14F
1A3A1CR7	10C	1A3A1R8	4E		

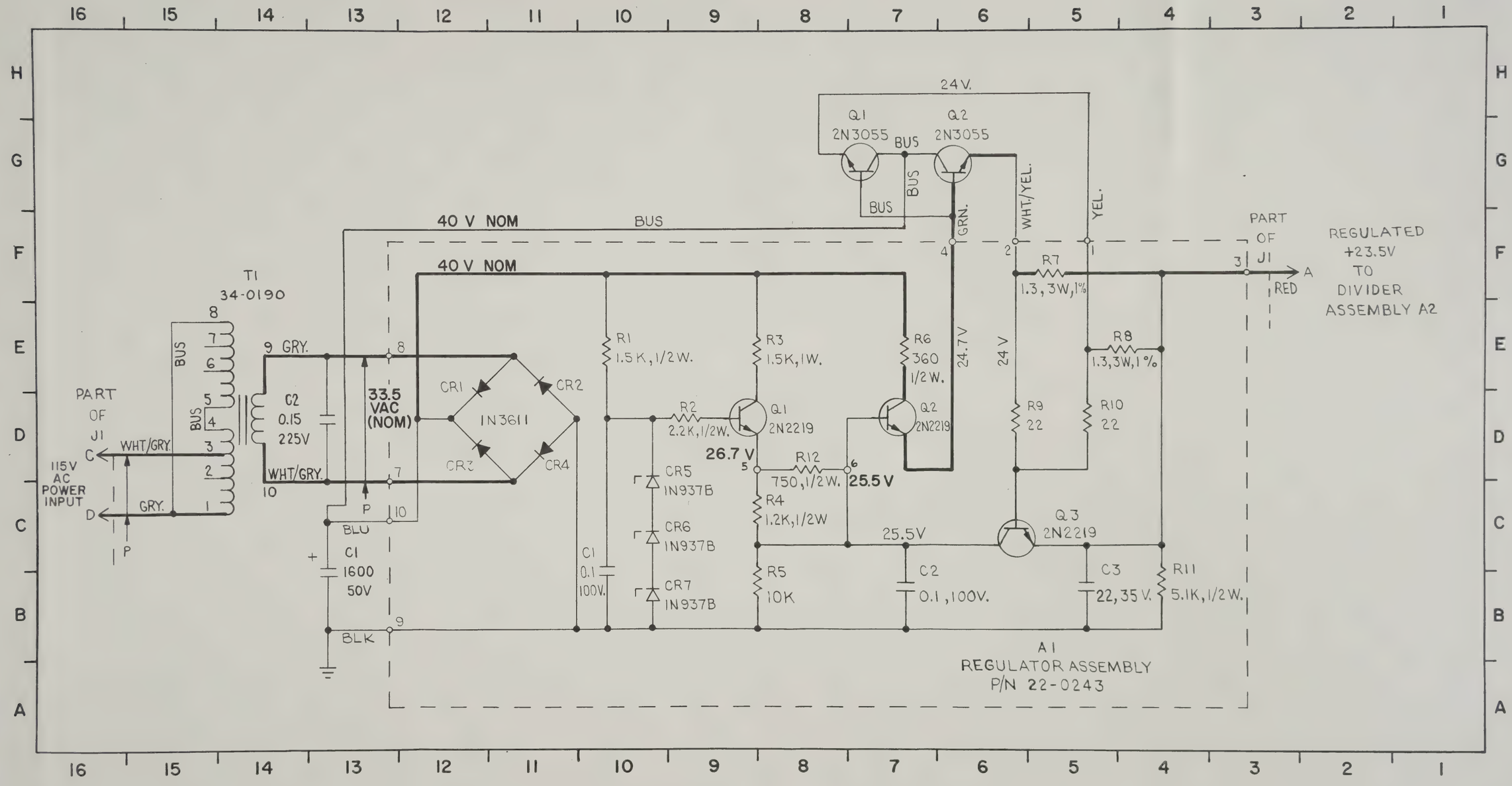


Figure 5-10. Power Supply, 1A3, Maintenance Schematic Diagram

(BLANK)

NOTES FOR FIGURE 5-11

GENERAL NOTES

A. EXPLODED VIEW APPLICABLE TO BOTH DIVIDER ASSEMBLIES, 1A2, PART NUMBER 34-0086-1 USED ON CU-1382F/FRR AND PART NUMBER 34-0086-2 USED ON CU-1382G/FRR.

B. REMOVE HEATSINK AS FOLLOWS:

1. REMOVE 5 HEATSINK RETAINING SCREWS ON EACH END OF HEATSINK.

2. REMOVE 10 SCREWS, LOCK WASHERS AND FLAT WASHERS SECURING WAKEFIELD CLIPON HEATSINKS.

NOTE

IF TRANSISTORS MUST BE REMOVED, REMOVE WITH WAKEFIELD HEATSINK ATTACHED. WHEN REPLACING HEATSINK, USE SCREWS PROVIDED OR SCREWS NOT EXCEEDING 1/2 INCH IN LENGTH. REPLACE ALL SCREWS.

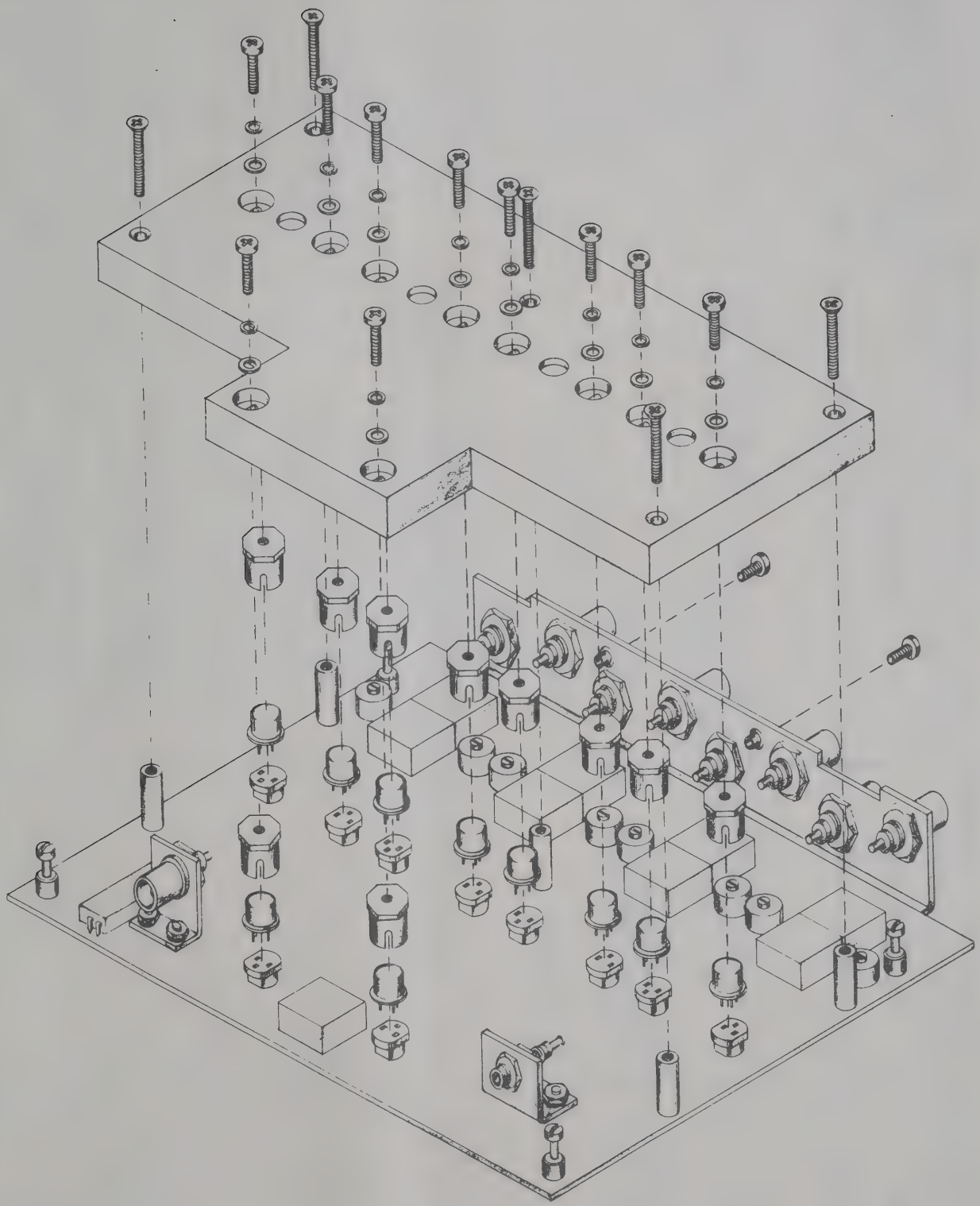


Figure 5-11. Heatsink Removal

Table 5-5. Performance Tests for CU-1382F/FRR and CU-1382G/FRR

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
		NOTE The following comprehensive tests are included for complete testing of the antenna coupler. These tests are included for reference purposes.		
1. Gain/Gain Tracking	Network Analyzer Hewlett-Packard 675A/676A Oscilloscope	NOTE Gain is to be measured at frequencies 2.0 MHz, 17.0 MHz and 28 MHz with the antenna coupler input filter installed. Gain at 0.3 MHz is to be measured with the antenna coupler input filter by-passed.		
		a. Connect test equipment as shown in figure 5-12.	2.0 dB ± 1.0 dB with filter installed	
		b. Set sweep generator output for -10 dBm, 1-32 MHz.	2.0 dB ± 1.0 dB with filter bypassed	
		c. Calibrate equipment for 1 dB/centimeter on oscilloscope.	Tracking within ± 0.5 dB	
		d. Terminate all unused outputs of the antenna coupler with 50 ohm loads.		

Table 5-5. Performance Tests for CU-1382F/FRR and CU-1382G/FRR (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
1. Gain/Gain Tracking (Cont)		e. Measure gain at antenna coupler outputs 1 through 8 at frequencies of 2.0 MHz, 17 MHz and 28 MHz. f. Disconnect coax cable at the input of the 1:8 divider. Disconnect coax cable at the input of the antenna coupler filter and connect it to the input of the 1:8 divider. g. Measure gain at antenna coupler outputs 1 through 8 at 0.3 MHz. h. Determine that gain of each output tracks within ± 0.5 dB tracking at each frequency. i. Reconnect antenna coupler filter.	± 0.5 dB tracking	

Table 5-5. Performance Tests for CU-1382F/FRR and CU-1382G/FRR (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
2. Noise Figure	Noise Generator Aero Space Research Inc. Model NS-6 (or equivalent) Low Noise Post Amplifier 20 dB gain minimum Noise and Field Intensity Meter Empire Devices NF-105 (or equivalent) Variable attenuator 28480-355C RF Voltmeter 04901-91H-S7 (or equivalent)	Initial test conditions: a. Terminate unused ports in 50 ohms. b. Connect rf filter. a. Disconnect antenna coupler from the test setup. Connect the output of the noise generator directly into the post amplifier. b. Turn the noise generator output to minimum (two knobs) and obtain a convenient reference level on the rf voltmeter with the receiver tuned to F1 the lowest frequency of interest (see test data sheet, figure 5-15, rf gain max, agc off, rf attenuation min., output preselector set to WB, mode switch to am, if bw to 6 kc, and second vfo to int. c. Insert 3 dB attenuation in the adjustable pad (from 0 dB attenuation) and increase the noise generator output to the		5-14 5-15

Table 5-5. Performance Tests for CU-1382F/FRR and CU-1382G/FRR (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
2. Noise Figure (Cont)		same reference level previously obtained. Read noise figure directly from the noise generator front panel meter and record on the data sheet in the column designated receiver noise figure. d. Repeat steps 2 and 3 at each of the frequencies indicated on test data sheet by tuning the receiver to these frequencies. e. Connect antenna coupler into test setup as shown in figure 5-14. Repeat steps 2, 3 and 4 filling in the noise figure column labelled combination noise figure. Remove the rf filter when making measurements below 2 MHz. f. Fill in data sheet column labelled antenna coupler gain using data obtained in the gain test of paragraph 9.0 and previously recorded on the data sheets.		

Table 5-5. Performance Tests for CU-1382F/FRR and CU-1382G/FRR (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
2. Noise Figure (Cont)		g. Compute antenna coupler noise figure using the following formula: $F_a = F_{ab} - \frac{F_b - 1}{G_a}$ $F_a(dB) = 10 \log_{10}[F_{ab} - \frac{F_b - 1}{G_a}]$ F_{ab} = Noise Figure of the combination in dB F_a = Noise Figure of antenna coupler expressed as a power ratio F_b = Noise Figure of post amp expressed as a power ratio G_a = Available power gain of the antenna coupler Place the computed antenna coupler noise figure numbers in the proper column on the data sheet.		

Table 5-5. Performance Tests for CU-1382F/FRR and CU-1382G/FRR (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
3. Intermodulation Test	RF Signal Generator CAQ1-606-B (or equivalent) NOTE: 2 required RF Voltmeter 04901-91H-S7 (or equivalent) Noise and Field Intensity Meter NF-105 (or equivalent) Power Combiner Adjustable Pad 0-120 dB 28480-355D 50 ohm termination	NOTE Refer to figure 5-16 for frequencies to be used for this test. a. Connect test equipment as shown in figure 5-17. b. Tune generator #1 to frequency f1 and generator #2 to f2. c. Disconnect generator #2 from power combiner. Terminate the power combiner with 50 ohms. d. Adjust generator #1 for 0.5 rms (measure with RF VTVM at the input of the antenna coupler. e. Adjust generator #2 to the power divider. Disconnect generator #1 from power combiner and terminate the combiner with 50 ohms. f. Adjust generator #2 for 0.5 vrms (measured with RF VTVM at the input of the antenna coupler.	-65 dB in-band -55 dB out-band	

Table 5-5. Performance Tests for CU-1382F/FRR and CU-1382G/FRR (Cont)

STEP	TEST EQUIPMFNT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
3. Intermodulation Test (Cont)		g. Reconnect generator #1 to the power combiner. Disconnect RF VTVM from input of antenna coupler. h. Tune the receiver to the frequency f3, (f1 $\pm$ f2 or 2 f1 $\pm$ f2). Decrease the attenuation of the variable attenuator as required to obtain a usable signal on the signal strength meter. i. Disconnect the variable attenuator from the output of the antenna coupler and connect generator #3 to the variable attenuator pad. j. Tune generator #3 to the frequency f3 of the receiver as previously set in procedure 8. NOTE: Tuning generator #3 to f3 may be accomplished by a combination of generator output voltage and step pad attenuation that will produce a convenient level on the signal strength meter. k. Adjust variable attenuator for 100 dB attenuation.		

Table 5-5. Performance Tests for CU-1382F/FRR and CU-1382G/FRR (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
3. Intermodulation Test (Cont)		l. Disconnect generator #3 from the adjustable attenuator and set the generator output level for 0.5 vrms as measured with an RF VTVM into a 50 ohm load. m. Reconnect generator #3 to the variable attenuator. n. Adjust receiver input attenuator for 20 dB of attenuation and set a convenient reference level on the signal strength meter. NOTE: This is the 0 dB reference point for the frequencies f1 and f2. o. Disconnect generator #3 and reconnect the antenna coupler output to the variable attenuator. p. Decrease the attenuation of the variable attenuator until the signal strength meter indicates the same level as obtained in procedure 14. NOTE: The amount of attenuation removed from the variable attenuator is the level of the intermodulation product (in dB) below 0.5 volts.		

Table 5-5. Performance Tests for CU-1382F/FRR and CU-1382G/FRR

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
3. Intermodulation Test (Cont)		q. Repeat procedure 2 through 16 for other frequencies as tabulated in table r. Bypass antenna coupler input filter and repeat procedures 2 through 16 as required for frequencies noted in table		

Table 5-5. Performance Tests for CU-1382F/FRR and CU-1382G/FRR (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
4. Input and Output VSWR	Network Analyzer Hewlett-Packard 675A/676A Oscilloscope AN/USM-281 (or equivalent) Directional Bridge Hewlett-Packard 8721A (or equivalent)	Connect equipment as shown in figure 5-18. Set frequency range of sweep generator to 1-32 MHz with rf output level of -10 dBm. Calibrate equipment for 10 dB per centimeter on the oscilloscope. Adjust a reference level on the oscilloscope with the Directional Bridge load open or disconnected. Terminate all unused outputs or input of antenna coupler with 50 ohm load. Measure input or output vswr by connecting load of directional bridge to the antenna coupler input or outputs. (Refer to chart to determine vswr, i.e., -14 dB = 1.5:1)		

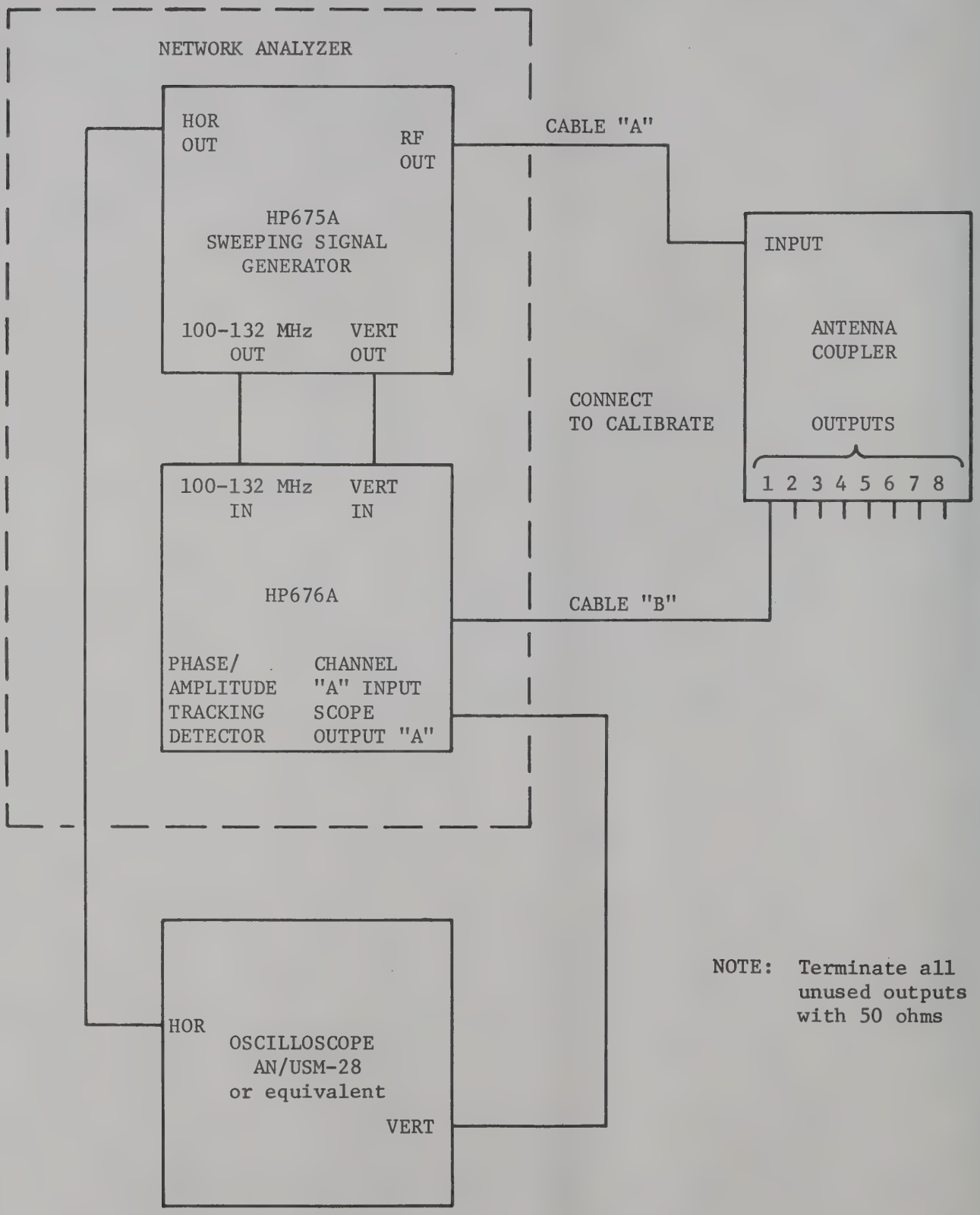


Figure 5-12. Gain - Gain/Tracking Bench Test Setup

DATA SHEET - GAIN

TEST PARAGRAPH #9

MODEL CU-1382F/FRR CU-1382G/FRR

SERIAL NO. _____

DATE _____ TEST TECHNICIAN _____

OUTPUT NO.	2 MHz	17 MHz	28 MHz	0.3 MHz
1				
2				
3				
4				
5				
6				
7				
8				

ACCEPTANCE CRITERION: ALL READINGS MUST BE BETWEEN 1 AND 5 DB.

For Type III only: maximum gain variation between outputs for:

2 MHz _____
17 MHz _____
28 MHz _____
0.3 MHz _____

ACCEPTANCE CRITERION: MAXIMUM GAIN VARIATION MUST BE 1 DB OR LESS.

Figure 5-13

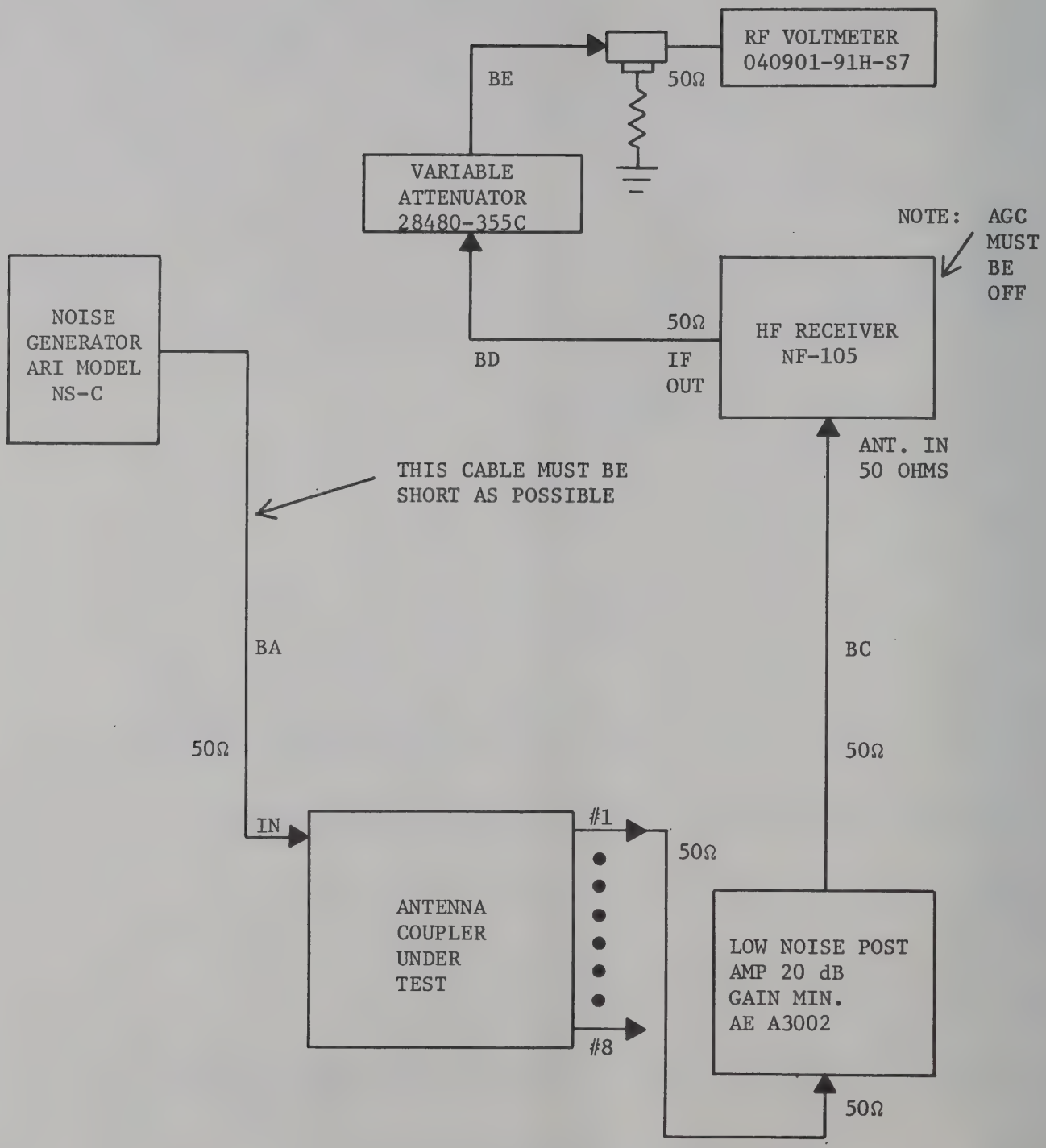


Figure 5-14. Test Setup - Noise Figure

	FREQUENCY (MHz)	POST AMP N.F. F_b(dB)	COMBINATION N.F. F_{ab}(dB)	ANT. COUPLER GAIN G_a(dB)	CORRECTED ANT. COUPLER F_a(dB)
RF FILTER BYPASSED					
RF FILTER INSTALLED					

SPEC LIMIT IS 7.5 DB MAX FOR CORRECTED N.F. EXCEPT:

"Type II multicouplers may have a maximum noise figure of 7.6 dB at 2.0 MHz and 8.0 at 31.8 MHz. The Type III multicouplers may have a maximum noise figure of 8.35 dB at 31.8 MHz." AUTH: NESC LTR 226-0561525

LINE VOLTAGE _____

TEST PROC. PARA. _____

STEP # _____

MODEL # _____

SERIAL # _____

DATE _____

TEST ENGR _____

Figure 5-15

FREQ. PAIR NUMBER	F1	F2	F3			
			2ND ORDER		3RD ORDER	
			FREQ.(F1±F2)	LEVEL(REL.DB)	FREQ.(2F1±F2)	LEVEL(REL.DB)
1	2.1	3.0	5.1		7.2	
2	3.5	5.0	1.5		2.0	
3	3.5	5.0	8.5		12.0	
4	5.6	8.0	13.6		19.2	
5	5.6	8.0	2.4		3.2	
6	7.7	11.0	18.7		26.4	
7	7.7	11.0	3.3		4.4	
8	11.2	16.0	27.2		6.4	
9	11.2	16.0	4.8		--	
10	15.4	22.0	6.6		8.8	
11	21.0	30.0	9.0		12.0	
12	3.5	3.0	.5		10.0	
13	2.2	3.0	.8		1.4	
14	15.4	22.0	37.4		52.8	
15	30.0	21.0	51.0		39.0	
16	21.0	30.0	--		72.0	
*17	.7	.3	.4		1.7	
*18	.8	.5	.3		1.1	

SPEC LIMITS = ≥ -65 dB Rel. .5V

* Filter bypassed

DATA SHEET #_____INTERMODULATION DISTORTION

TEST PARAGRAPH _____

TEST STEP _____

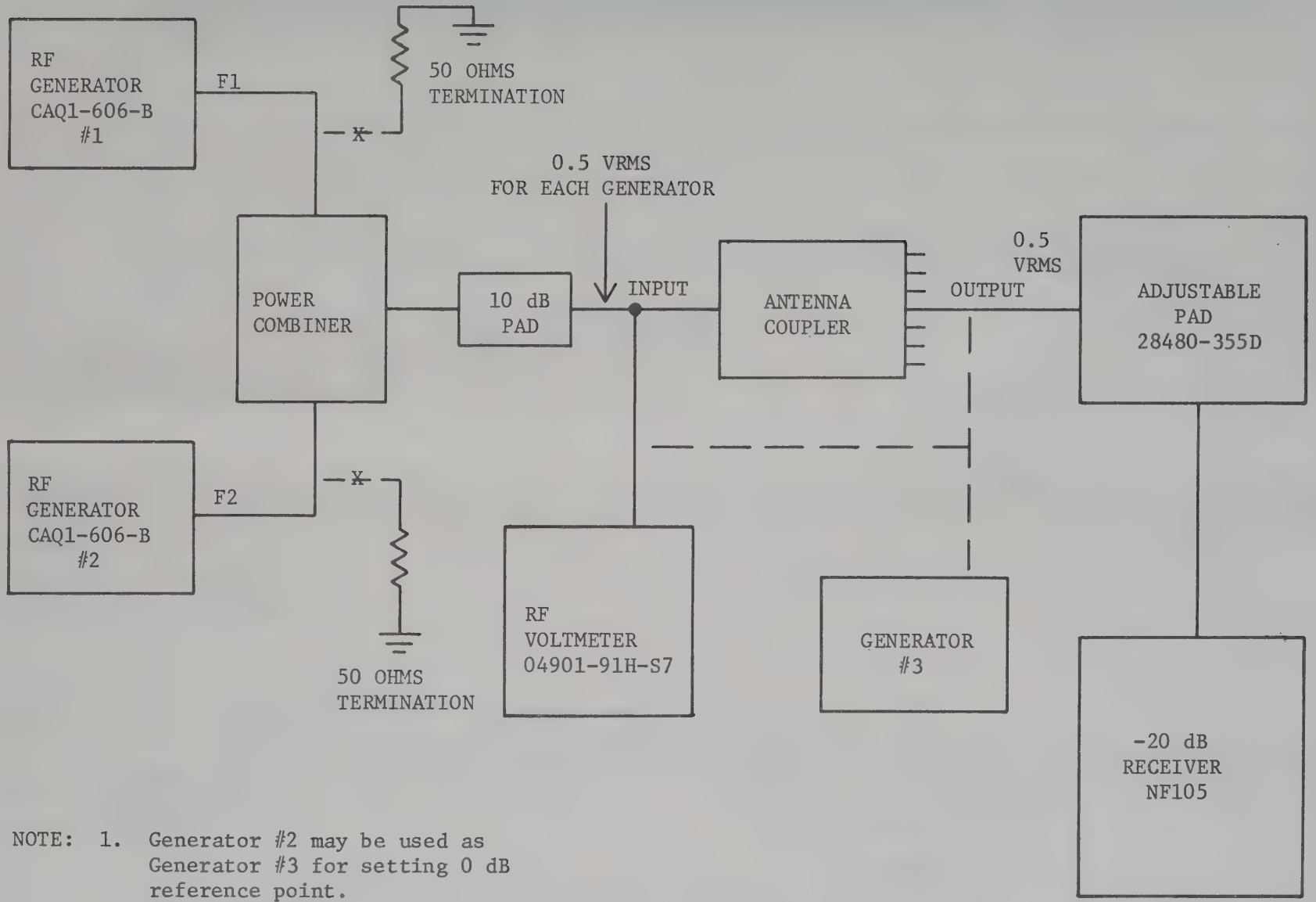
MODEL NO _____

SERIAL NO _____

DATE _____

TEST ENGR. _____

Figure 5-16



NOTE: 1. Generator #2 may be used as Generator #3 for setting 0 dB reference point.

2. Terminate all unused antenna coupler outputs with 50 ohms.

Figure 5-17. Intermodulation Bench Test Setup

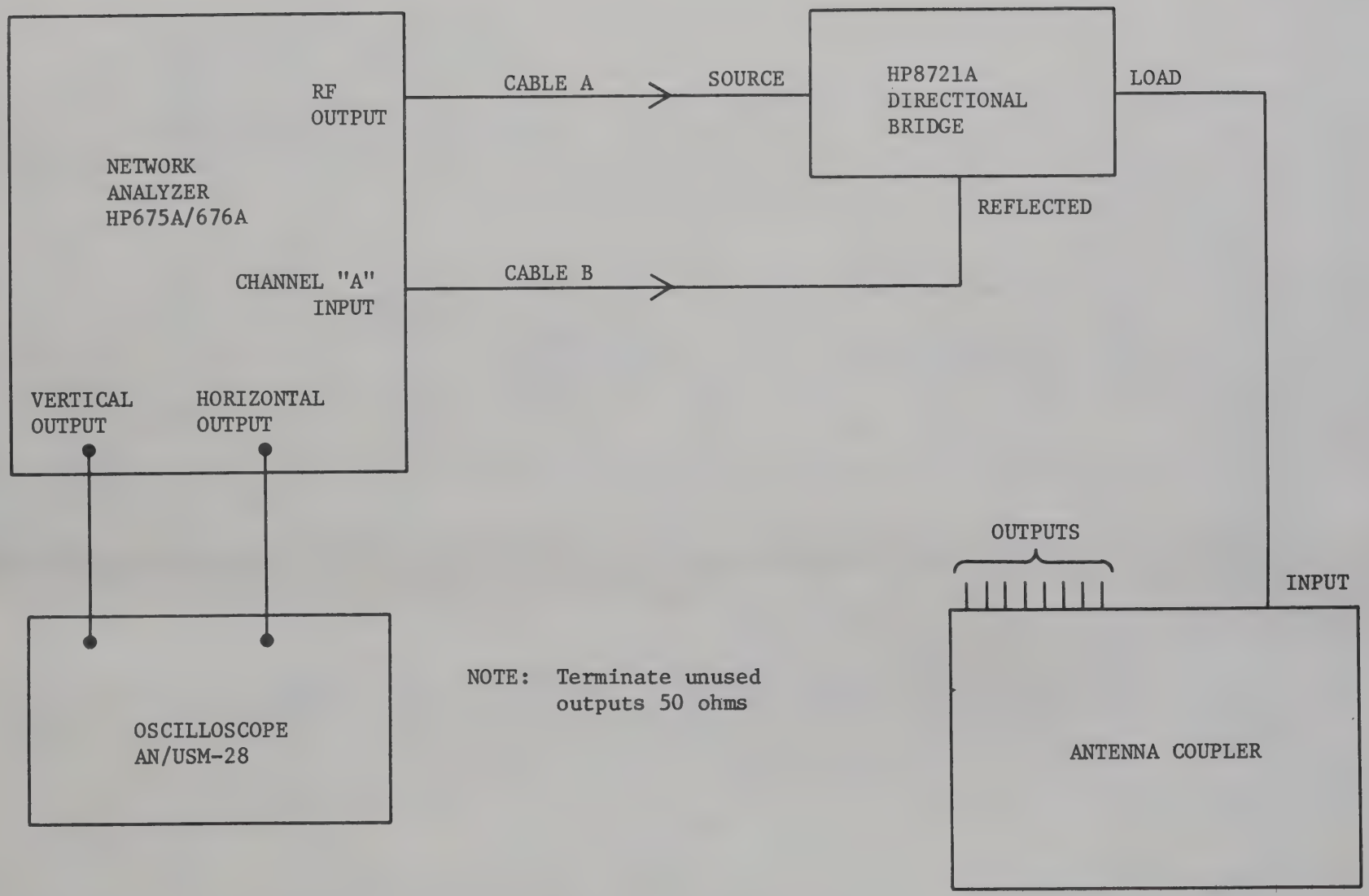


Figure 5-18. Input/Output VSWR Test Setup

RETURN LOSS dB down	VSWR	RETURN LOSS dB down	VSWR
0.0			
0.5	34.7	21.0	1.196
1.0	17.3	21.5	1.184
1.5	11.6	22.0	1.172
2.0	8.71	22.5	1.162
2.5	7.00	23.0	1.152
3.0	5.85	23.5	1.143
3.5	5.02	24.0	1.135
4.0	4.42	24.5	1.127
4.5	3.95	25.0	1.119
5.0	3.57	25.5	1.112
5.5	3.26	26.0	1.105
6.0	3.01	26.5	1.099
6.5	2.80	27.0	1.094
7.0	2.62	27.5	1.088
7.5	2.46	28.0	1.083
8.0	2.32	2 .5	1.078
8.5	2.21	29.0	1.074
9.0	2.10	29.5	1.069
9.5	2.01	30.0	1.065
10.0	1.92	30.5	1.062
10.5	1.85	31.0	1.058
11.0	1.79	31.5	1.055
11.5	1.72	32.0	1.051
12.0	1.67	32.5	1.049
12.5	1.62	33.0	1.046
13.0	1.58	33.5	1.043
13.5	1.53	34.0	1.041
14.0	1.50 ←LIMIT	34.5	1.038
14.5	1.46	35.0	1.036
15.0	1.43	35.5	1.034
15.5	1.40	36.0	1.032
16.0	1.38	36.5	1.030
16.5	1.35	37.0	1.029
17.0	1.33	37.5	1.027
17.5	1.31	38.0	1.026
18.0	1.29	38.5	1.024
18.5	1.27	39.0	1.023
19.0	1.25	39.5	1.021
19.5	1.233	40.0	1.020
20.0	1.222		
20.5	1.208		

Figure 5-19. Return Loss to VSWR

CHAPTER 6

CORRECTIVE MAINTENANCE

6-1. INTRODUCTION.

6-2. This chapter contains all instructions required to align and adjust the CU-1382F/FRR and CU-1382G/FRR and its subassemblies, and to remove, repair, and test repairable subassemblies. This chapter is divided into two sections. Section I contains information and procedures for alignment and adjustment of electronic circuits and mechanical assemblies; Section II contains repair instructions, which cover disassembly, means of access, parts removal, and complex repair actions.

6-3. GENERAL.

6-4. This section contains all information and procedures required to perform all necessary alignments and adjustments of the CU-1382F/FRR and CU-1382G/FRR at station and depot level. Included are alignment and adjustment procedures for electronic assemblies. Test equipment setup drawings are provided where necessary to support the procedures.

6-5. ELECTRONIC ALIGNMENTS AND ADJUSTMENTS.

6-6. PROCEDURES. Overall alignment and adjustment procedures for the CU-1382F/FRR and CU-1382G/FRR are given in table 6-1; procedures for the individual assemblies and subassemblies within the multicoupler are also given in table 6-1.

6-7. Each alignment and adjustment table gives the test equipment requirements, step-by-step procedures, adjustment values, and references to supporting illustrations showing the necessary test setups.

6-8. SAFETY PRECAUTIONS. Observe all standard safety precautions whenever performing any of the alignments and adjustments in this section. Refer to paragraph 4-5.

6-9. TEST EQUIPMENT REQUIRED. All alignment and adjustment procedures in this chapter use the approved test equipments listed in table 1-4.

Table 6-1. Antenna Couplers CU-1382F/FRR and CU-1382G/FRR, Overall Alignment and Adjustment Procedures

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
1. Preliminary Procedure		a. Set power switch 1S1 to OFF. b. Loosen cover screws and remove cover.		
2. Power supply check	Multimeter AN/USM-311 (or equivalent)	a. Connect multimeter between terminal 1A3J1 (+) and chassis (-). b. Set power switch 1S1 to ON. c. Check that multimeter indicates 23.5 volts ± 0.5 volts. - - - - - CAUTION - - - - - If multimeter indicates higher than 24 volts or less than 23.0 volts, return power switch to OFF and troubleshoot the power supply.		
3. Isolation Output/Output	Network Analyzer HP675A/676A Oscilloscope AN/USM-281 (or equivalent)	NOTE Remove heatsink. - - - - - CAUTION - - - - - Consecutive operating time for multicouplers without heatsinks shall not exceed two minutes.		

Table 6-1. Antenna Couplers CU-1382F/FRR and CU-1382G/FRR, Overall Alignment and Adjustment Procedures (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
		a. Connect test equipment as shown in figure 6-1.		
		b. Set sweep generator output for -10 dBm, 1-32 MHz.		
		c. Calibrate equipment for 10 dB/centimeter on oscilloscope.	-40 dB min.	
		d. Terminate input and all unused outputs of the antenna coupler with 50 ohm loads.		
		e. With cables "A" and "B" connected to antenna coupler output 1 and 2, adjust variable capacitor C23 for maximum isolation across 2-32 MHz band.	-40 dB min.	
		f. Disconnect cables "A" and "B" from antenna coupler and connect to outputs 3 and 4. Adjust C21 for maximum isolation.	-40 dB min.	
		g. Disconnect cables "A" and "B" from antenna coupler and connect to outputs 5 and 6. Adjust C19 for maximum isolation.	-40 dB min.	

Table 6-1. Antenna Couplers CU-1382F/FRR and CU-1382G/FRR, Overall Alignment and Adjustment Procedures (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
		h. Disconnect cables "A" and "B" from antenna coupler and connect to outputs 7 and 8. Adjust C17 for maximum isolation.	-40 dB min.	
		i. Disconnect cables "A" and "B" from antenna coupler and test all combinations of antenna coupler outputs for isolation. In the event any two or more outputs are not -40 dB or better, repeat procedures 5 through 9.	-40 dB min.	

Table 6-1. Antenna Couplers CU-1382F/FRR and CU-1382G/FRR, Overall Alignment and Adjustment Procedures (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
4. Phase Correlation Adjustment	Network Analyzer Hewlett-Packard 675A/676A Oscilloscope AN/USM-281 (or equivalent)	NOTE This procedure is to be used only when checking or adjusting phase tracking between the 8 outputs of a single antenna coupler. If it is desired to check or adjust phase tracking against another antenna coupler or standard, refer to procedure 5. NOTE Multicouplers and test equipment must be operating for 4 hours prior to performing this adjustment. a. Calibrate test equipment and connect cables "A" and "B" to the antenna coupler outputs 1 and 8 as shown in figure 6-2. Set sweep generator for -10 dBm output, 1-32 MHz. b. Adjust variable capacitor C39 to its mid-range position. c. Adjust variable capacitor C32 for minimum phase shift difference.	± 2.0 degrees	

Table 6-1. Antenna Couplers CU-1382F/FRR and CU-1382G/FRR, Overall Alignment and Adjustment Procedures (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
4. Phase Correlation Adjustment (Cont)		d. In the event capacitor C32 cannot be adjusted within ± 2 degrees, readjust C39 slightly from its preset position and adjust C32. e. Repeat procedures 2-4 as necessary until phase shift is within ± 2.0 degrees. f. Disconnect cable "B" and connect it to antenna coupler output #7. Adjust C33 for minimum phase shift difference. g. Disconnect cable "B" and connect to antenna coupler output #6, and adjust C34 for minimum phase shift difference. h. Disconnect cable "B" and connect to antenna coupler output #5 and adjust C35 for minimum phase shift difference. i. Disconnect cable "B" and connect to antenna coupler output #4, and adjust C36 for minimum phase shift difference.		

Table 6-1. Antenna Couplers CU-1382F/FRR and CU-1382G/FRR, Overall Alignment and Adjustment Procedures (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
4. Phase Correlation Adjustment (Cont)		j. Disconnect cable "B" and connect to antenna coupler #3, and adjust C37 for minimum phase shift difference. k. Disconnect cable "B" and connect to antenna coupler output #2, and adjust C38 to minimum phase shift. NOTE In the event the phase shift of any of the antenna coupler outputs are not within ± 2.0 degrees, repeat procedures 2 through 11.		

Table 6-1. Antenna Couplers CU-1382F/FRR and CU-1382G/FRR, Overall Alignment and Adjustment Procedures (Cont)

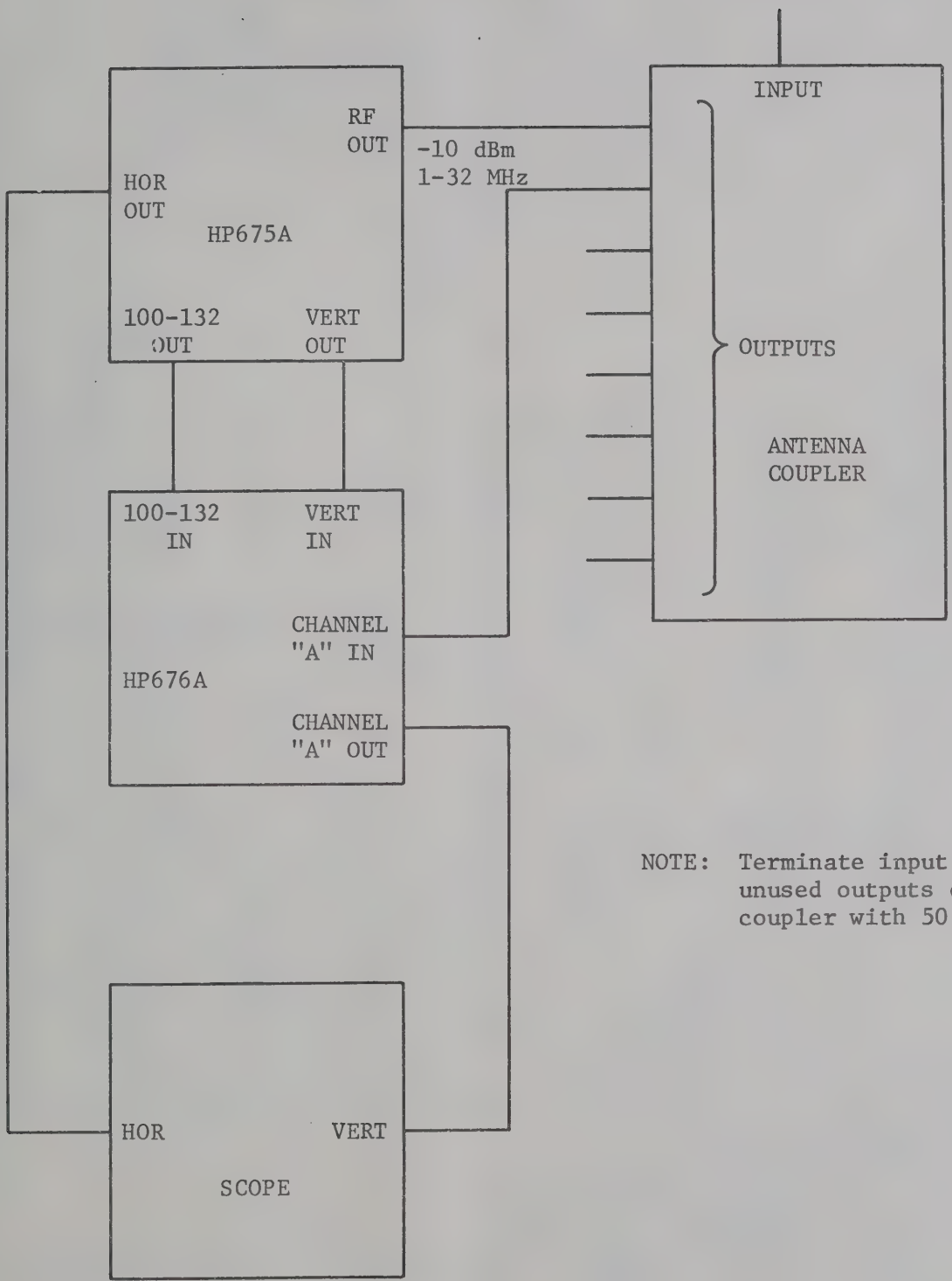
STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
5. Phase Correlation	Network Analyzer Hewlett-Packard 675A/676A Oscilloscope AN/USM-281 (or equivalent)		± 2.0 degrees	
		NOTE This procedure is to be used only when comparing, adjusting or checking phase with a phase STANDARD antenna coupler. If it is desired to check or adjust phase between outputs of a single antenna coupler, refer to procedure 4.		
		NOTE Multicouplers and test equipment must be operating for 4 hours prior to performing this adjustment.		
		a. Connect and calibrate equipment as shown in figure 6-2. Set sweep generator for -10 dBm output, 1-32 MHz.		
		b. With cables "B" and "D" connected to the antenna coupler under test as shown in figure 6-2, adjust capacitor C39 for minimum phase shift difference.	± 2.0 degrees	

Table 6-1. Antenna Couplers CU-1382F/FRR and CU-1382G/FRR, Overall Alignment and Adjustment Procedures (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST EQUIP FIG. NO.
5. Phase Correlation (Cont)		c. Disconnect cable "B" and connect it to antenna coupler output #2. Adjust capacitor C38 for minimum phase shift difference.	± 2.0 degrees	
		d. Disconnect cable "B" and connect it to antenna coupler output #3. Adjust capacitor C37 for minimum phase shift difference.	± 2.0 degrees	
		e. Disconnect cable "B" and connect it to antenna coupler output #4. Adjust capacitor C36 for minimum phase shift difference.	± 2.0 degrees	
		f. Disconnect cable "B" and connect it to antenna coupler output #5. Adjust capacitor C35 for minimum phase shift difference.	± 2.0 degrees	
		g. Disconnect cable "B" and connect it to antenna coupler output #6. Adjust capacitor C34 for minimum phase shift difference.	± 2.0 degrees	

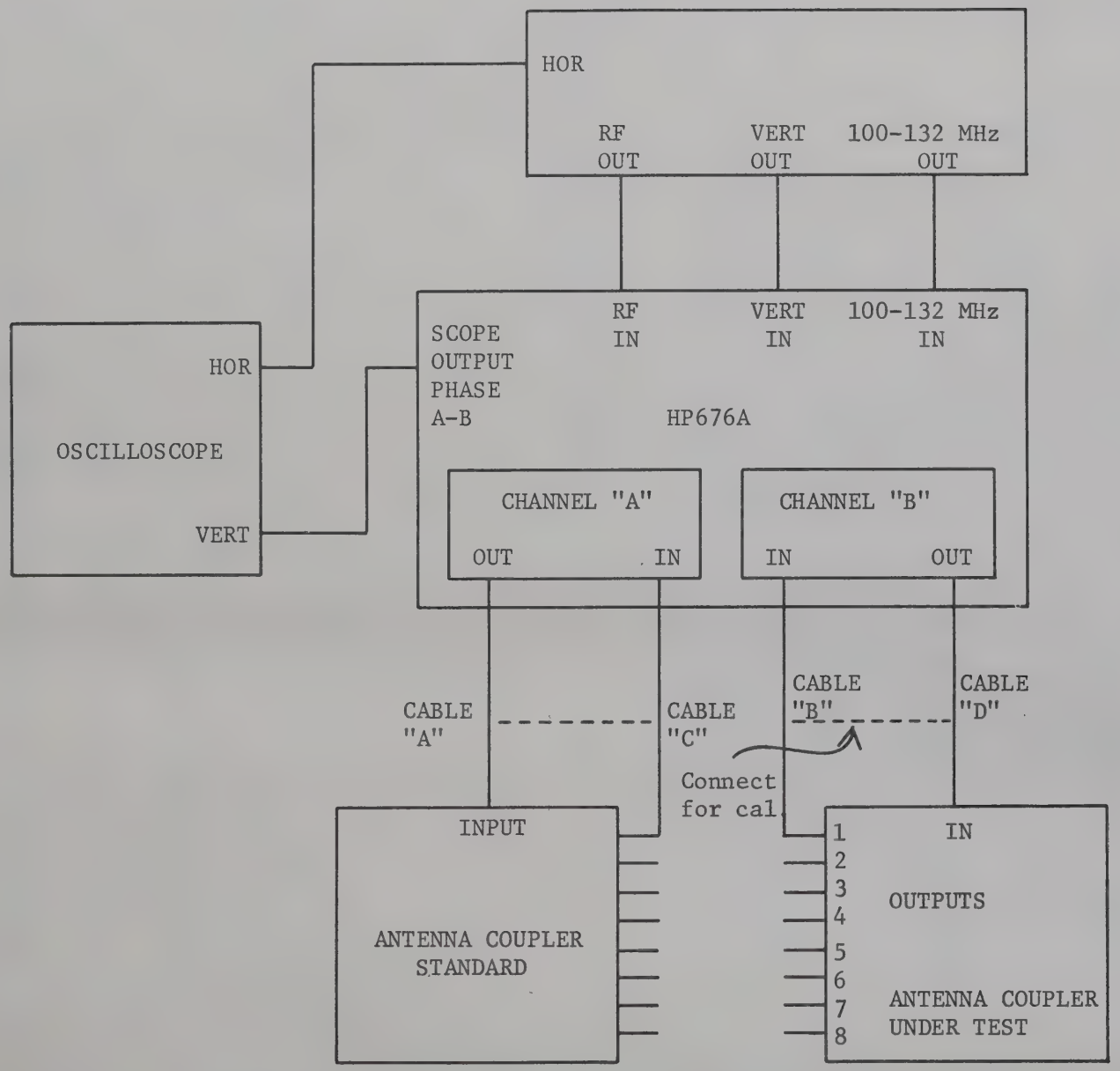
Table 6-1. Antenna Couplers CU-1382F/FRR and CU-1382G/FRR, Overall Alignment and Adjustment Procedures (Cont)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE	TEST SETUP FIG. NO.
5. Phase Correlation (Cont)		h. Disconnect cable "B" and connect it to antenna coupler output #7. Adjust capacitor C33 for minimum phase shift difference.	± 2.0 degrees	
		i. Disconnect cable "B" and connect it to antenna coupler output #8. Adjust capacitor C32 for minimum phase shift difference	± 2.0 degrees	



NOTE: Terminate input and all unused outputs of antenna coupler with 50 ohms.

Figure 6-1. Isolation - Output/Output Bench Test Setup



NOTES: 1. Cables "A" and "C" must be equal in length to cables "B" and "D".

2. Terminate unused outputs of antenna coupler under test with 50 ohms.

Figure 6-2. Phase Correlation Bench Test Setup

CHAPTER 7

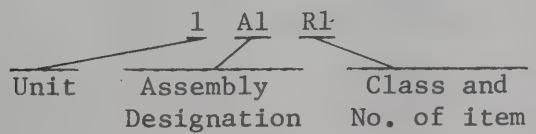
PARTS LIST

7-1. INTRODUCTION.

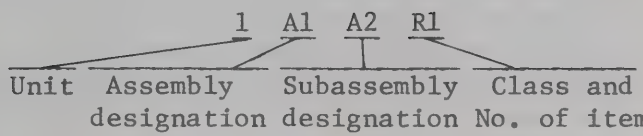
7-2. LIST OF ASSEMBLIES. Table 7-1 is a listing of the assemblies included in the antenna couplers CU-1382F/FRR and CU-1382G/FRR. These are listed by reference designations in numerical order. Thus, when the complete reference designation of a part is known, this table will furnish the identification of the assembly in which the part is located, since the first number of a complete reference designation provides the following information for each assembly listed: (1) official name, (2) designation, and (3) the location of the first page of its parts listing in table 7-2.

7-3. REFERENCE DESIGNATIONS. The numbering method of assigning reference designations has been used to identify assemblies, subassemblies, and parts. This method has been expanded as necessary to cover adequately the various degrees of subdivision of the equipment. Examples of this numbering method and typical expansions of the same are illustrated by the following:

a. Example 1:



b. Example 2:



Read as: First (1) resistor (R) of second (2) subassembly (A) of first (1) assembly (a) of first unit (1).

7-4. Partial reference designations are used on the equipment and illustrations. The partial reference designations consist of the class letter (s) and the identifying item number. The complete reference designations may be obtained by placing the proper prefix before the partial reference designations. Prefixes are provided on illustrations following the notation "REF DESIG PREFIX".

7-5. MAINTENANCE PARTS LISTING.

7-6. PARTS LIST. Table 7-2 lists all assemblies and their maintenance parts, in numerical sequence by reference designation. Maintenance parts for each assembly are listed alphanumerically by class of part following the assembly designation. Thus, the parts for each assembly are grouped together. Table 7-2 provides the following information: (1) complete reference designation of each assembly, subassembly

and part, (2) reference to explanatory notes, (3) noun name and brief description, and (4) identification of the parts location illustration which pictorially locates the part:

a. Column 1, Reference Designation. The parts list is divided and arranged by major assemblies in numerical sequence (e.g., assembly A1 with its subassemblies, parts, etc., precedes assembly A2 with its parts). All parts attached to the assembly are listed first in alphanumerical order, followed by subassemblies with parts, and additional subassemblies with parts, also listed in alphanumerical order, as follows:

Assembly	A1
(Assembly parts)	
	A1C1
	A1CR1
	A1R1
	Etc.
Subassembly	A1A1
(Subassembly parts)	
	A1A1C1
	A1A1CR1
	A1A1R1

b. Column 2, Notes. Parts variations within each article are identified by a letter symbol in the Notes column of table 7-2. The absence of a letter symbol in the Notes column indicates that the part is used on all articles covered by this technical manual. Note A indicates that the part is used only on CU-1382F/FRR and note B indicates that the part is used only in CU-1382G/FRR. Note 1 is defined as a selected value as assembly. Note 2 indicates a part (such as a cable) which is not called out on the parts location diagram.

c. Column 3, Name and Description. This column contains the name, including descriptive data and military type number of the item. Those parts not having a military type number include physical characteristics. Following the description are the manufacturer's part number and the contractor's part number.

d. Column 4, Figure Reference Number. This column lists the figure number and item number (enclosed in parenthesis) of the parts location illustration (located at end of the chapter), which shows the physical location of the part.

7-7. LIST OF MANUFACTURERS. Table 7-3 contains the name, address, and code number of all manufacturers supplying items for equipment as referenced in the parts list. This list is in numerical sequence by code number. Code numbers are in accordance with Handbooks H4-1 and H4-2.

7-8. PARTS LOCATION ILLUSTRATIONS.

7-9. Parts location illustrations (figures 7-1 through 7-6) are located at the end of this chapter. Their purpose is to provide positive and rapid location of parts. Column 4 of table 7-2 references the appropriate illustration which pictorially locates the part in the equipment.

Table 7-1. Antenna Coupler, List of Major Assemblies

REFERENCE DESIGNATION	NOMENCLATURE	CU-1382F/FRR PAGE NO.	CU-1382G/FRR PAGE NO.
1A1	RF Filter	7-3	7-5
1A2	Divider Assembly	7-7	7-7
1A3	Power Supply	7-11	7-11
1A3A1	Regulator Assembly	7-11	7-11

Table 7-2. Antenna Coupler, CU-1382F/FRR and CU-1382G/FRR, Parts List

ANTENNA COUPLER CU-1382F/FRR AND CU-1382G/FRR

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
		COUPLER, ANTENNA, CU-1382F/FRR: mfr 23929 part number 34-0120-1.	1-1
		COUPLER, ANTENNA, CU-1382G/FRR: mfr 23929 part number 34-0120-2.	1-1
RF FILTER, 1A1, 34-0121			
1A1	A	RF FILTER: mfr 23929 part number 34-0121.	7-1
1A1C1	A	CAPACITOR, FIXED, MICA: 82 pF porm 2%; mil type CM05FD820G03.	7-2
1A1C2, C3	A	CAPACITOR, FIXED, MICA: 62 pF porm 2%; mil type CM05FD620G03.	7-2
1A1C4	A	CAPACITOR, FIXED, MICA: 1500 pF porm 2%; mil type CM05FD152G03.	7-2
1A1C5	A	CAPACITOR, FIXED, MICA: 4300 pF porm 2%; mil type CM06FD432G03.	7-2
1A1C6, C7, C9	A	CAPACITOR, FIXED, MICA: 1200 pF porm 2%; mil type CM06FD122G03.	7-2
1A1C8	A	CAPACITOR, FIXED, MICA: 200 pF porm 2%; mil type CM05FD201G03.	7-2

Table 7-2. Antenna Coupler CU-1382F/FRR and CU-1382G/FRR, Parts List (Cont)

RF FILTER, 1A1, 34-0121 (Cont)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
1A1C10	A	CAPACITOR, FIXED, MICA: 2000 pF porm 2%; mil type CM06FD202G03.	7-2
1A1C11	A	CAPACITOR, FIXED, MICA: 1000 pF porm 2%; mil type CM06FD102G03.	7-2
1A1J1, J2	A	CONNECTOR, RECEPTICAL, ELECTRIC: bnc, mil type UG1094/U.	7-2
1A1L1	A	COIL, RF: 0.16 uH porm 20%; mfr 23929 part number 22-0202-3.	7-2
1A1L2	A	COIL, RF: 0.09 uH porm 20%; mfr 23929 part number 22-0202-1.	7-2
1A1L3, L5	A	COIL, RF: 0.4 uH porm 20%; mfr 23929 part number 22-0202-8.	7-2
1A1L4	A	COIL, RF: 0.27 uH porm 20%; mfr 23929 part number 22-0202-16.	7-2
1A1L6	A	COIL, RF: 0.25 uH porm 20%; mfr 23929 part number 22-0202-5.	7-2
1A1L7	A	COIL, RF: 0.3 uH porm 20%; mfr 23929 part number 22-0202-6.	7-2
1A1L8	A	COIL, RF: 5.3 uH porm 20%; mfr 23929 part number 22-0202-10 (ATTACHING PARTS). SCREW, NYLON: mil type MS18212-15 (1) WASHER, FLAT, NYLON: mil type MS51859-2 (2) NUT, HEX, NYLON: mil type MS51858-2 (1)	7-2
1A1L9	A	COIL, RF: 8.0 uH porm 20%; mfr 23929 part number 22-0202-17 (ATTACHING PARTS). SCREW, NYLON: mil type MS18212-30 (1) WASHER, FLAT, NYLON: mil type MS51859-3 (2) NUT, HEX, NYLON: mil type MS51858-3 (1)	7-2
1A1L10	A	COIL, RF: 6.0 uH porm 20%; mfr 23929 part number 22-0202-12 (ATTACHING PARTS). SCREW, NYLON: mil type MS18212-15 (1) WASHER, FLAT, NYLON: mil type MS51859-2 (1) NUT, HEX, NYLON: mil type MS51858-3 (1)	7-2

Table 7-2. Antenna Coupler CU-1382F/FRR and CU-1382G/FRR, Parts List (Cont)

RF FILTER, 1A1, 34-0121 (Cont)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
1A1L11	A	COIL, RF: 5.0 uH porm 20%; mfr 23929 part number 22-0202-9 (ATTACHING PARTS). SCREW, NYLON: mil type MS18212-15 (1) WASHER, FLAT, NYLON: mil type MS51859-2 (2) NUT, HEX, NYLON: mil type MS51858-2 (1)	7-2
		MOUNT, CONNECTOR: 1.125 in. h, 0.75 in. w, base 0.5 in. l, 0.62 in. R bend, 0.375 in. D hole; mfr 23929 part number 17-0052(2) (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-15 (2) WASHER, LOCK: mil type MS35338-135 (2) WASHER, FLAT: mil type MS15795-803 (2) NUT, HEX: mil type MS35649-244 (2)	7-2(1)
		CIRCUIT BOARD: mfr 23929 part number 34-0193 (ATTACHING PARTS). SCREW CAPTIVE: mfr 06540 part number 6235-SS-0632, 23929 dwg 22-0651 RETAINER: mfr 06540 part number 6251A-SS-0632, 23929 dwg 22-0650	7-2(2)
RF FILTER, 1A1, 34-0122			
1A1	B	RF FILTER: mfr 23929 part number 34-0122.	7-1
1A1C1	B	CAPACITOR, FIXED, MICA: 91 pF porm 20%; mil type CM05FD910G03.	7-3
1A1C2	B	CAPACITOR, FIXED, MICA: 68 pF porm 20% mil type CM05FD680G03.	7-3
1A1C3	B	CAPACITOR, FIXED, MICA: 20 pF porm 20%; mil type CM05FD200D03.	7-3
1A1C4, C5	B	CAPACITOR, FIXED, MICA: 2700 pF porm 20%; mil type CM06FD272G03.	7-3
1A1C6, C9		CAPACITOR, FIXED, MICA: 1200 pF porm 20%; mil type CM06FD122G03.	7-3
1A1C7	B	CAPACITOR, FIXED, MICA: 1500 pF porm 20%; mil type CM06FD152G03.	7-3

Table 7-2. Antenna Coupler CU-1382F/FRR and CU-1382G/FRR, Parts List (Cont)

RF FILTER, 1A1, 34-0122 (Cont)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
1A1C8		NOT USED.	
1A1C10	B	CAPACITOR, FIXED, MICA: 10 pF porm 20%; mil type CM05CD100D03.	7-3
1A1C11		NOT USED.	
1A1J1, J2		CONNECTOR, RECEPTICAL, ELECTRIC: bnc; mil type UG1094/U.	7-3
1A1L1	B	COIL, RF: 0.25 uH porm 20%; mfr 23929 part number 22-0202-4.	7-3
1A1L2	B	COIL, RF: 0.11 uH porm 20%; mfr 23929 part number 22-0202-2.	7-3
1A1L3	B	COIL, RF: 0.45 uH porm 20%; mfr 23929 part number 22-0202-15.	7-3
1A1L4	B	COIL, RF: 0.25 uH porm 20%; mfr 23929 part number 22-0202-5.	7-3
1A1L5	B	COIL, RF: 0.34 uH porm 20%; mfr 23929 part number 22-0202-7.	7-3
1A1L6, L7		NOT USED.	
1A1L8	B	COIL, RF: 6.5 uH porm 20%; mfr 23929 part number 22-0202-11 (ATTACHING PARTS). SCREW, NYLON: mil type MS18212-15 (1) WASHER, FLAT, NYLON: mil type MS51859-2 (2) NUT, HEX, NYLON: mil type MS51858-2 (1)	7-3
1A1L9	B	COIL, RF: 6.9 uH porm 20%; mfr 23929 part number 22-0202-14 (ATTACHING PARTS). SCREW, NYLON: mil type MS18212-30 (1) WASHER, FLAT, NYLON: mil type MS51859-3 (2) NUT, HEX, NYLON: mil type MS51858-3 (1)	7-3
1A1L10		NOT USED.	
1A1L11	B	COIL, RF: 5.3 uH porm 20%; mfr 23929 part number 22-0202-10 (ATTACHING PARTS). SCREW, NYLON: mil type MS18212-15 (1) WASHER, FLAT, NYLON: mil type MS51859-2 (2) NUT, HEX, NYLON: mil type MS51858-2 (1)	7-3

Table 7-2. Antenna Coupler CU-1382F/FRR and CU-1382G/FRR, Parts List (Cont)

RF FILTER, 1A1, 34-0122 (Cont)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
		MOUNT, CONNECTOR: 1.125 in. h, 0.75 in. w, base 0.5 in. l, 0.62 in. R bend, 0.375 in. D hole; mfr 23929 part number 17-0052(2) (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-15 (2) WASHER, LOCK: mil type MS35338-135 (2) WASHER, FLAT: mil type MS15795-803 (2) NUT, HEX: mil type MS35649-244 (2)	7-3(1)
		CIRCUIT BOARD: mfr 23929 part number 34-0193 (ATTACHING PARTS). SCREW CAPTIVE: mfr 06540 part number 6235-SS-0632, 23929 dwg 22-0651. RETAINER: mfr 06540 part number 6251A-SS-0632, 23929 dwg 22-0650.	7-3(2)
DIVIDER ASSEMBLY, 1A2			
1A2	A	DIVIDER ASSEMBLY: mfr 23929 part number 34-0086-1 (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-13 (2)	7-1
1A2	B	DIVIDER ASSEMBLY: mfr 23929 part number 34-0086-2 (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-13 (2)	7-1
1A2C1, C3, C4		CAPACITOR, FIXED, CERAMIC: 0.01 uF p 80%, m 20%, 500 VdcW; mil type CK63AY103X.	7-4
1A2C2, C8 C12thruC15		CAPACITOR, FIXED, CERAMIC: 680 pF porm 20%, 1000 VdcW; mil type CK60AW681M.	7-4
1A2C5	1	CAPACITOR, FIXED, CERAMIC: 6 pF porm 0.25 pF, 500 VdcW; mil type CC22CH060C.	7-4
1A2C6, C7	1	CAPACITOR, FIXED, CERAMIC: 1.0 pF porm 0.25 pF, 500 VdcW; mil type CC22CH010C.	7-4
1A2C9		CAPACITOR, FIXED, TANTALUM: 2.2 uF porm 20%, 20 VdcW; mil type CSR13E225ML.	7-4
1A2C10		CAPACITOR, FIXED, NONSOLID ELECTROLYTIC: 68 uF porm 20%, 30 VdcW; mil type CL67BH680MPG.	7-4

Table 7-2. Antenna Coupler CU-1382F/FRR and CU-1382G/FRR, Parts List (Cont)

DIVIDER ASSEMBLY, 1A2 (Cont)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
1A2C11		CAPACITOR, FIXED, NONSOLID ELECTROLYTIC: 150 uF porm 20%, 30 VdcW; mil type CL67BH151MPG.	7-4
1A2C16, C18, C20, C22		CAPACITOR, FIXED, MICA: 10 pF porm 5%, 500 VdcW; mil type CM05ED100J03.	7-4
1A2C17, C19, C21, C23thruC31		CAPACITOR, VARIABLE, CERAMIC: 9-35 pF, 100 VdcW; mil type CV31D350.	7-4
1A2C32thru C39		CAPACITOR, VARIABLE, CERAMIC: 9-35 pF, 100 VdcW; mil type CV31D350.	7-4
1A2CR1		SEMICONDUCTOR DEVICE, DIODE: silicon; mil type 1N645.	7-4
1A2CR2		SEMICONDUCTOR DEVICE, DIODE: silicon, zener; mil type 1N753A.	7-4
1A2CR3		SEMICONDUCTOR DEVICE, DIODE: silicon, zener; mil type 1N752A.	7-4
1A2J1		TEST POINT, JACK: red; mil type MS39024/10-02.	7-4
1A2J2thru J10		CONNECTOR, RECEPTICAL, ELECTRICAL: mil type UG1094/U.	7-4
1A2K1		RELAY ELECTRICAL: spst 12 Vdc; mfr 02288 part number RFX241, 23929 dwg 22-0653.	7-4
1A2L1, L4, L5		COIL, RF: 15 uH; mil type MS18130-22.	7-4
1A2L2, L3		COIL, RF: 0.68 uH; mil type MS18130-6.	7-4
1A2L6thru L9		COIL, RF: 0.1 uH porm 20%; mfr 23929 part number 22-0202-13.	7-4
1A2Q1, Q2 Q4thruQ11		TRANSISTOR, NPN: Case TO-39; mfr 91281 part number PT4599, 23929 dwg 22-0652.	7-4
1A2Q3		TRANSISTOR: silicon, NPN; mil type 2N2222.	7-4

Table 7-2. Antenna Coupler CU-1382F/FRR and CU-1382G/FRR, Parts List (Cont)

DIVIDER ASSEMBLY, 1A2 (Cont)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
1A2R1		RESISTOR, FIXED, FILM: 732 ohms porm 1%, 1/4 watt; mil type RN60D7320F.	7-4
1A2R2		RESISTOR, FIXED, COMPOSITION: 1K ohm porm 5%, 1W; mil type RCR32G102JS.	7-4
1A2R3, R4		RESISTOR, FIXED, FILM: 365 ohms porm 1%, 1/4W; mil type RN60D3650F.	7-4
1A2R5		RESISTOR, FIXED, COMPOSITION: 680 ohms porm 5%, 1/2W; mil type RCR20G681JS.	7-4
1A2R6		RESISTOR, FIXED, COMPOSITION: 4.7K ohms porm 5%, 1/4W; mil type RCR07G472JS.	7-4
1A2R7		RESISTOR, FIXED, COMPOSITION: 33K ohms porm 5%, 1/4W; mil type RCR07G333JS.	7-4
1A2R8		RESISTOR, FIXED, COMPOSITION: 16K ohms porm 5%, 1/4W; mil type RCR07G163JS.	7-4
1A2R9		RESISTOR, FIXED, COMPOSITION: 2.2k ohms porm 5%, 1/2W; mil type RCR20G222JS.	7-4
1A2R10, R13thruR21		RESISTOR, FIXED, COMPOSITION: 15 ohms porm 5%, 1/2W; mil type RCR20G150JS.	7-4
1A2R11, R12		RESISTOR, FIXED, COMPOSITION: 110 ohms porm 5%, 1W; mil type RCR32G151JS.	7-4
1A2R22 thruR29		RESISTOR, FIXED, FILM: 24.9 ohms porm 1%, 1/2W; mil type RN65D24R9F.	7-4
1A2R30 thruR33		RESISTOR, FIXED, COMPOSITION: 39 ohms porm 5%, 2W; mil type RCR42G390JS.	7-4
1A2R34thru R37		RESISTOR, FIXED, FILM: 66.5 ohms porm 1%, 1/4W; mil type RN60D66R5F.	7-4
1A2T1		TRANSFORMER, RF: primary 6 turns, secondary 9 turns; mfr 23929 part number 34-0189.	7-4
1A2T2thru T9		TRANSFORMER, RF: primary 9 turns, secondary 6 turns; mfr 23929 part number 34-0186.	7-4

Table 7-2. Antenna Coupler CU-1382F/FRR and CU-1382G/FRR, Parts List (Cont)

DIVIDER ASSEMBLY, 1A2 (Cont)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
		MOUNT, CONNECTOR: 1.125 in. h, 0.75 in. w, base 0.5 in. 1, 0.62 in. R bend, 0.375 in. D hole; mfr 23929 part number 17-0052 (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-14 (2) WASHER, LOCK: mil type MS35338-135 (2) WASHER, FLAT: mil type MS15795-803 (2) NUT, HEX: mil type MS35649-244 (2)	7-4(1)
		MOUNT, CONNECTOR: 0.75 in. h, 0.812 in. w, base 0.562 in. 1, 0.06 in. R bend, 0.266 in. hole; mfr 23929 part number 17-0053 (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-14 (2) WASHER, LOCK: mil type MS35338-135 (2) WASHER, FLAT: mil type MS15795-803 (2) NUT, HEX: mil type MS35649-244 (2)	7-4(2)
		MOUNT, CONNECTOR: 1.19 in. h, 5.94 in. w, base 0.49 1, 8-0.343 D holes, base 4-0.125 in. holes; mfr 23929 part number 22-0185. (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-14 (4) WASHER, LOCK: mil type MS35338-135 (4) WASHER, FLAT: mil type MS15795-803 (4) NUT, HEX: mil type MS35649-244 (4)	7-4(3)
		SOCKET, TRANSISTOR: mfr 91662 part number 05-3338, 23929 dwg 22-0655 (10).	7-4(4)
		HEATSINK: TO-39 case, no 4 hole, 40 threads per inch; mfr 05820 part number 260-4TH5, 23929 dwg 22-0656 (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-17 (10) WASHER, LOCK: mil type MS35338-135 (10) WASHER, FLAT: mil type MS15795-803 (10)	7-4(5)
		SPACER: 0.25 in. dia, 0.75 in. 1, alum, iridite finish; mfr 06540 part number 8159-A-440-17, 23929 dwg 22-0657 (5) (ATTACHING PARTS). SCREW PAN HEAD: mil type MS51957-14 (5) WASHER, LOCK: mil type MS35338-135 (5) WASHER, FLAT: mil type MS15795-803 (5)	7-4(6)

Table 7-2. Antenna Coupler CU-1382F/FRR and CU-1382G/FRR, Parts List (Cont)

DIVIDER ASSEMBLY, 1A2 (Cont)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
		CIRCUIT BOARD: mfr 23929 part number 34-0093 (ATTACHING PARTS). SCREW CAPTIVE: mfr 06540 part number 6235-SS-0632, 23929 dwg 22-0651. RETAINER: mfr 06540 part number 6251A-SS-0632, 23929 dwg 22-0650.	7-4(7)
		HEATSINK: 3.88 in. h, 7.0 in. w, 10-0.375 in. holes; mfr 23929 part number 34-0188 (ATTACHING PARTS). SCREW, FLAT HEAD: mil type MS24693-C8 (5)	7-4(8)
POWER SUPPLY			
1A3		POWER SUPPLY: mfr 23929 part number 34-0187.	7-1
REGULATOR ASSEMBLY, 1A3A1			
1A3A1		REGULATOR ASSEMBLY: mfr 23929 part number 22-0243 (ATTACHING PARTS). SCREW PAN HEAD: mil type MS51957-13 (2) WASHER, LOCK: mil type MS35338-135 (2) WASHER, FLAT: mil type MS15795-803 (2)	7-5(1)
1A3A1C1, C2		CAPACITOR, FIXED, CERAMIC: 0.1 uF porm 20%, 100 VdcW; mil type CK05BX104M.	7-6
1A3C3		CAPACITOR, FIXED, TANTALUM: 22 uF porm 10%, 35 VdcW; mil type CSR13F226KL.	7-6
1A3CR1thru CR4		SEMICONDUCTOR DEVICE, DIODE: rectifier; mil type 1N3611.	7-6
1A3CR5thru CR7		SEMICONDUCTOR DEVICE, DIODE: silicon, zener; mil type 1N937B.	7-6
1A3A1Q1 thruQ3		TRANSISTOR: silicon, NPN, switch; mil type 2N2219.	7-6
1A3A1R1		RESISTOR, FIXED, COMPOSITION: 1.5K ohm, $\pm$ 5%, 1/2W; mil type RCR20G152JS.	7-6
1A3A1R2		RESISTOR, FIXED, COMPOSITION: 2.2K ohm porm 5%, 1/2W; mil type RCR20G222JS.	7-6

Table 7-2. Antenna Coupler CU-1382F/FRR and CU-1382G/FRR, Parts List (Cont)

REGULATOR ASSEMBLY, 1A3A1

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
1A3A1R3		RESISTOR, FIXED, COMPOSITION: 1.5K ohm porm 5%, 1W; mil type RCR32G152JS.	7-6
1A3A1R4		RESISTOR, FIXED, COMPOSITION: 1.2K ohm porm 5%, 1/2W; mil type RCR20G122JS.	7-6
1A3A1R5		RESISTOR, FIXED, COMPOSITION: 10K ohm porm 5%, 1/4W; mil type RCR07G103JS.	7-6
1A3A1R6		RESISTOR, FIXED, COMPOSITION: 360 ohms porm 5%, 1/2W; mil type RCR20G361JS.	7-6
1A3A1R7, R8		RESISTOR, FIXED, WIREWOUND: 1.3 ohms porm 1%, 3W; mil type RW69V1R3.	7-6
1A3A1R9, R10		RESISTOR, FIXED, COMPOSITION: 22 ohms porm 5%, 1/4W; mil type RCR07G220JS.	7-6
1A3A1R11		RESISTOR, FIXED, COMPOSITION: 5.1K ohms porm 5%, 1/2W; mil type RCR20G512JS.	7-6
1A3A1R12		RESISTOR, FIXED, COMPOSITION: 750 ohms porm 5%, 1/2W; mil type RCR20G751JS.	7-6
		TERMINAL: mil type MS17122-10 (10)	7-6(1)
		CIRCUIT BOARD: mfr 23929 part number 22-0242.	7-6(2)

POWER SUPPLY CHASSIS

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
1A3C1		CAPACITOR, FIXED ELECTROLYTIC: 1600 uF m 10% p 100%, 50 VdcW; mil type CE71C162G.	7-5
1A3C2		CAPACITOR, FIXED, TANTALUM: 15 uF porm 20%, 225 VdcW; mil type CL33BXR15LNE.	7-5
1A3J1		CONNECTOR, RECEPTICAL, ELECTRICAL: mil type MS3112E8-4P (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-13 (4) WASHER, FLAT: mil type MS15795-803 (4) WASHER, LOCK: mil type MS35338-135 (4) NUT, HEX: mil type MS35649-244 (4)	7-5

Table 7-2. Antenna Coupler CU-1382F/FRR and CU-1382G/FRR, Parts List (Cont)

POWER SUPPLY CHASSIS (Cont)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
1A3Q1, Q2		TRANSISTOR: silicon, NPN, Power Amplifier; mil type 2N3055 (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-28(2) WASHER, FLAT: mil type MS15795-805 (2) WASHER, LOCK: mil type MS35338-136 (2) NUT, HEX: mil type MS35649-264 (2)	7-5
1A3T1		TRANSFORMER, POWER: mfr 40857 part number TF5RX02Z2 23929 dwg 34-0190 (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-28 (4) WASHER, FLAT: mil type MS15795-805 (4) WASHER, LOCK: mil type MS35338-136 (4)	7-5
		LUG, TERMINAL: mil type MS77067-2 (2)	7-5(2)
		LUG, TERMINAL: mil type MS77070-5 (2)	7-5(3)
		CLAMP COMPONENT: 1 in. w, 0.69 in. R bend; mfr 23929 part number 17-0051 (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-13 (2) WASHER, LOCK: mil type MS35338-135 (2) WASHER, FLAT: mil type MS15795-803 (2)	7-5(4)
		PLATE, MOUNTING: 5.125 in. w, 4 in. h, 0.312 in. D; mfr 23929 part number 22-0184.	7-5(5)
		BRACKET, TRANSFORMER: mfr 23929 part number 22-0186 (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-28 (4) WASHER, LOCK: mil type MS35338-136 (4) WASHER, FLAT: mil type MS15795-805 (4)	7-5(6)
ANTENNA COUPLER CHASSIS			
1DS1		LAMP: mil type MS18237-2RN.	7-1
1E1		SURGE VOLTAGE PROTECTOR: 90 +40-OVRS, <1VSS, 5 amps ird; mfr 25088 part number B1F90, 23929 dwg 22-0165.	7-1(1)
1F1thruF3		FUSE: 1 ampere slo-blo; mil type F02B250V1A.	7-1
1FL1, 1FL2		FILTER: mil type FL24DD1EA3.	7-1

Table 7-2. Antenna Coupler CU-1382F/FRR and CU-1382G/FRR, Parts List (Cont)

ANTENNA COUPLER CHASSIS (Cont)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
1J2		CONNECTOR, RECEPTICAL, ELECTRICAL: mil type UG1094/U.	7-1
1S1		SWITCH TOGGLE: dpst; mil type MS35059-22.	7-1
1W1		CABLE ASSEMBLY, COAXIAL: mfr 23929 part number 17-0108.	7-1
1W1P1, P2		CONNECTOR, PLUG, ELECTRICAL: bnc; mil type UG88/U.	7-1
1W2		CABLE ASSEMBLY, POWER: mfr 23929 part number 22-0668.	7-1
1W2P1		CONNECTOR, PLUG, ELECTRONIC: mil type MS3106A10SL35(C).	7-1
		CABLE CLAMP: mil type MS3057-4.	7-1
		CABLE AND PLUG: 3 conductor with molded plug 70 in. 1; mfr 70903 part number 17236, 23929 dwg 22-0670.	7-1
1W3		CABLE ASSEMBLY: mfr 23929 part number 22-0667.	7-1
1W3P1		CONNECTOR, PLUG, ELECTRIC: bnc; mil type UG88/U.	7-1
1XDS1		HOLDER, LAMP: mil type LH90/1.	7-1
1XF1thru 1XF3		HOLDER, FUSE: mil type FHL17G1.	7-1
	A	NAMEPLATE: mfr 23929 part number 22-0162 (ATTACHING PARTS). SCREW PAN HEAD: mil type MS51957-11 (2)	7-1(2)
	B	NAMEPLATE: mfr 23929 part number 22-0168 (ATTACHING PARTS). SCREW PAN HEAD: mil type MS51957-11 (2)	7-1(2)
		PARTITION: 8.32 in. 1, 1.41 in. h, 0.09 in. R bend, 0.62 in. base; mfr 23929 part number 22-0183 (ATTACHING PARTS). SCREW, FLAT HEAD: mil type MS24693-C1 (3)	7-1(3)

Table 7-2. Antenna Coupler CU-1382F/FRR and CU-1382G/FRR, Parts List (Cont)

ANTENNA COUPLER CHASSIS (Cont)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
		COVER, PANEL: 8.50 in. l, 1.72 in. h, 0.125 in. D; mfr 23929 part number 22-0187 (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-46 (4) WASHER, FLAT: mil type MS15795-807 (4) WASHER, LOCK: mil type MS35338-137 (4) NUT, HEX: mil type MS35649-284 (4)	7-1(4)
		LUG, GROUND: 0.375 in. id, 0.656 in. od, 1.156 in. l; mfr 86928 part number 5428, 23929 dwg 22-0664.	7-1(5)
		HANDLE: 0.31 in. d, 3.0 in. l, 8-32 holes; mfr 06540 part number 10325SS0832, 23929 dwg 22-0665 (ATTACHING PARTS). SCREW, FLAT HEAD: mil type MS24693-C50 (4)	7-1(6)
		PANEL FRONT: 19 in. l, 0.18 in. d, 1.719 in. h; mfr 23929 part number 34-0074 (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-45 (2) WASHER, FLAT: mil type MS15795-807 (4) WASHER, LOCK: mil type MS35338-137 (4)	7-1(7)
		COVER: 16.87 in. w, 8.37 in. h, 0.062 in. D; mfr 23929, part number 34-0076.	7-1(8)
		CHASSIS: mfr 23929 part number 34-0185.	7-1
1W4		CABLE ASSEMBLY: mfr 23929 part number 22-0661.	7-1
1W4J1		CONNECTOR, RECEPTICAL, ELECTRICAL: mil type MS3102A10SL3P (ATTACHING PARTS). SCREW, PAN HEAD: mil type MS51957-14 (4) WASHER, FLAT: mil type MS15795-803 (4) WASHER, LOCK: mil type MS35338-135 (4) NUT, HEX: mil type MS35649-244	7-1
		GROMMET: mil type MS35490-4.	7-1
		LUG, GROUND: mil type MS77068-1 (1).	7-1
		LUG: mil type MS25036-101.	7-1
		CABLE ASSEMBLY: mfr 23929 part number 22-0662.	7-1

Table 7-2. Antenna Coupler CU-1382F/FRR and CU-1382G/FRR, Parts List (Cont)

ANTENNA COUPLER CHASSIS (Cont)

REFERENCE DESIGNATION	NOTES	NAME AND DESCRIPTION	FIGURE NUMBER (INDEX)
1P1		CONNECTOR, PLUG, ELECTRICAL: mil type MS3116E8-4S	7-1
1P2		CONNECTOR, PLUG, ELECTRICAL: single connector; mfr 83330 part number 203, 23929 dwg 22-0663.	7-1

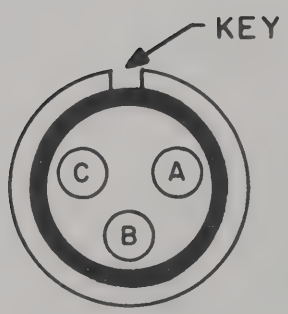
Table 7-3. List of Manufacturers

CODE NUMBER	MANUFACTURERS NAME AND ADDRESS
01281	TRW Semiconductors Inc. 14520 Aviation Blvd. Lawndale, California 90260
02114	Ferroxcube Corp. Mt. Marion Road Saugerties, New York 12477
02288	Allied Control Co., Inc. West Main Street Plantsville, Connecticut 10021
05820	Wakefield Engineering Inc. Audubon Road Wakefield, Massachusetts 01886
06540	Amatom Electronic Hardware Division of Mitre Corp. 81 Rockdale Avenue New Rochelle, New York 10802
23929	Aero Geo Astro A Division of Aiken Industries 7411-50th Avenue College Park, Maryland 20740
24088	Siemens America, Inc. 350 Fifth Avenue New York, New York 10001
70903	Belden Corp. 415 S. Kilpatrick Chicago, Illinois 60644
83330	Herman H. Smith, Inc. 812 Snediker Avenue Brooklyn, New York 11207
86928	Seastrom Mfg. Co., Inc. 701 Sonora Avenue Glendale, California 91201
91662	Elco Corp. Maryland Road and Computer Avenue Willow Grove, Pennsylvania 19090

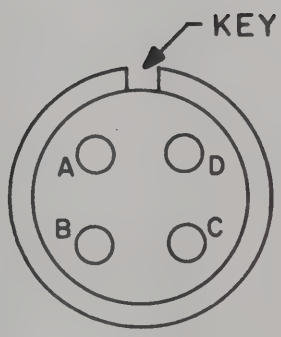
NOTES FOR FIGURE 7-1

PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A1	6E	1J1	2C	1W2P1	2C
1A2	4D	1J2	2F	1W3	8C
1A3	6D	1P1	5D	1W3P1	8E
1DS1	9C	1P2	4C	1W4	8E
1E1	3E	1S1	8C	1W4J1	8E
1F1	8E	1W1	5E	1XDS1	4E
1F2	8E	1W1P1	6E	1XF1	5E
1F3	8E	1W1P2	4E	1XF2	7C
1FL1	7E	1W2	2B	1XF3	3C
1FL2	7E				



1P1, 1A3J1



1W2P1, 1J1

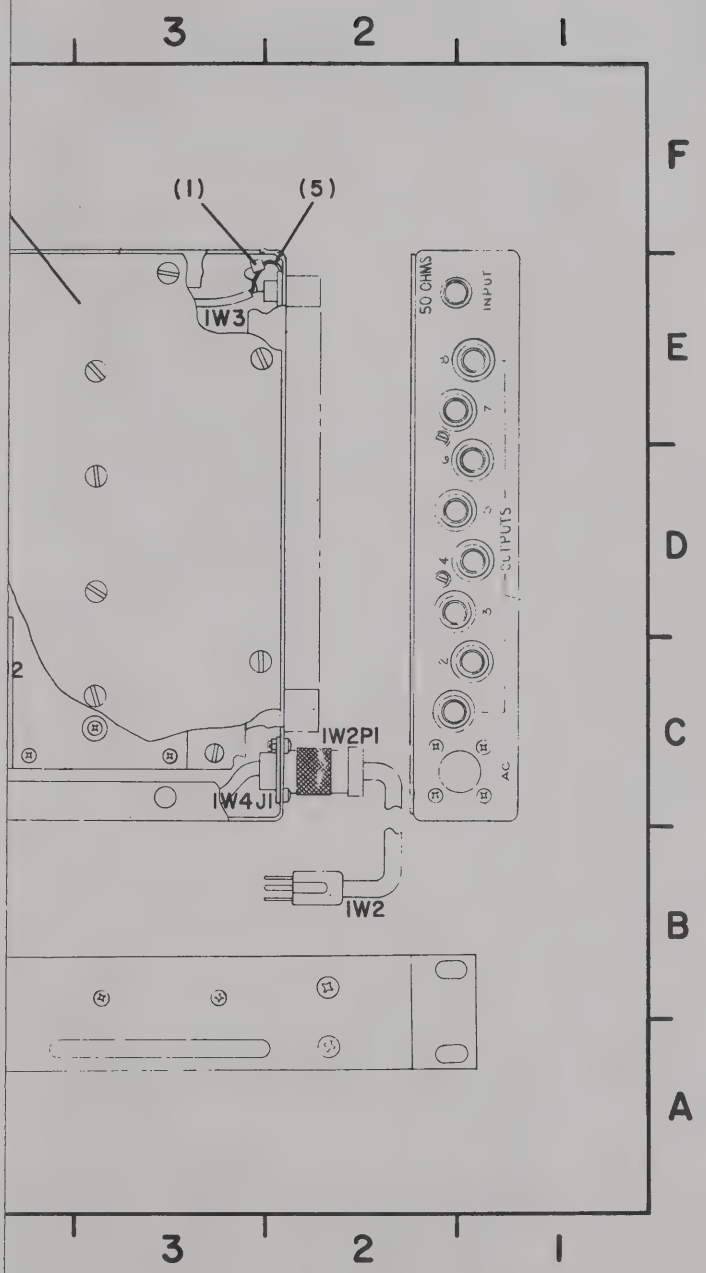
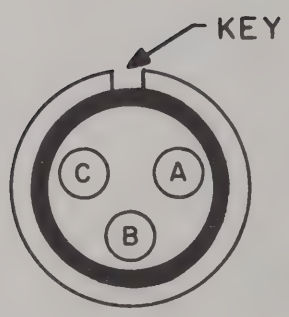


Figure 7-1. Antenna Coupler, Parts Location

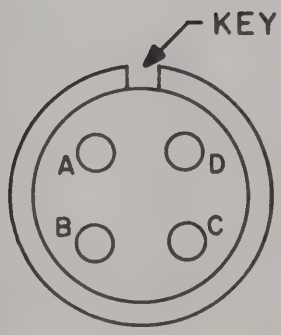
NOTES FOR FIGURE 7-1

PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A1	6E	1J1	2C	1W2P1	2C
1A2	4D	1J2	2F	1W3	8C
1A3	6D	1P1	5D	1W3P1	8E
1DS1	9C	1P2	4C	1W4	8E
1E1	3E	1S1	8C	1W4J1	8E
1F1	8E	1W1	5E	1XDS1	4E
1F2	8E	1W1P1	6E	1XF1	5E
1F3	8E	1W1P2	4E	1XF2	7C
1FL1	7E	1W2	2B	1XF3	3C
1FL2	7E				



1P1, 1A3J1



1W2P1, 1J1

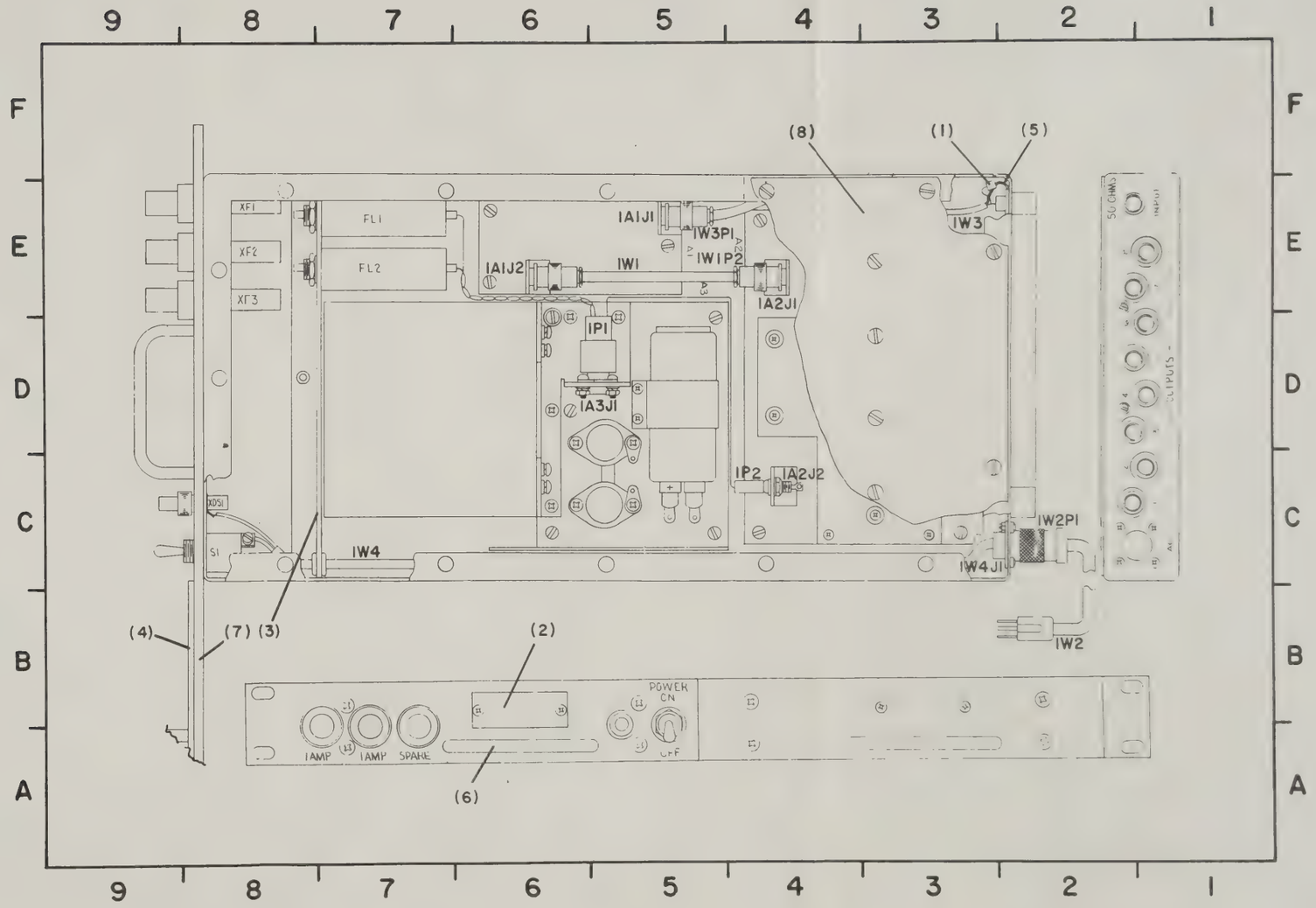


Figure 7-1. Antenna Coupler, Parts Location

(BLANK)

NOTES FOR FIGURE 7-2 (Sheet 1 of 2)

PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A1C1		1A1C9		1A1L4	
1A1C2		1A1C10		1A1L5	
1A1C3		1A1C11		1A1L6	
1A1C4		1A1J1		1A1L7	
1A1C5		1A1J2		1A1L8	
1A1C6		1A1L1		1A1L9	
1A1C7		1A1L2		1A1L10	
1A1C8		1A1L3		1A1L11	

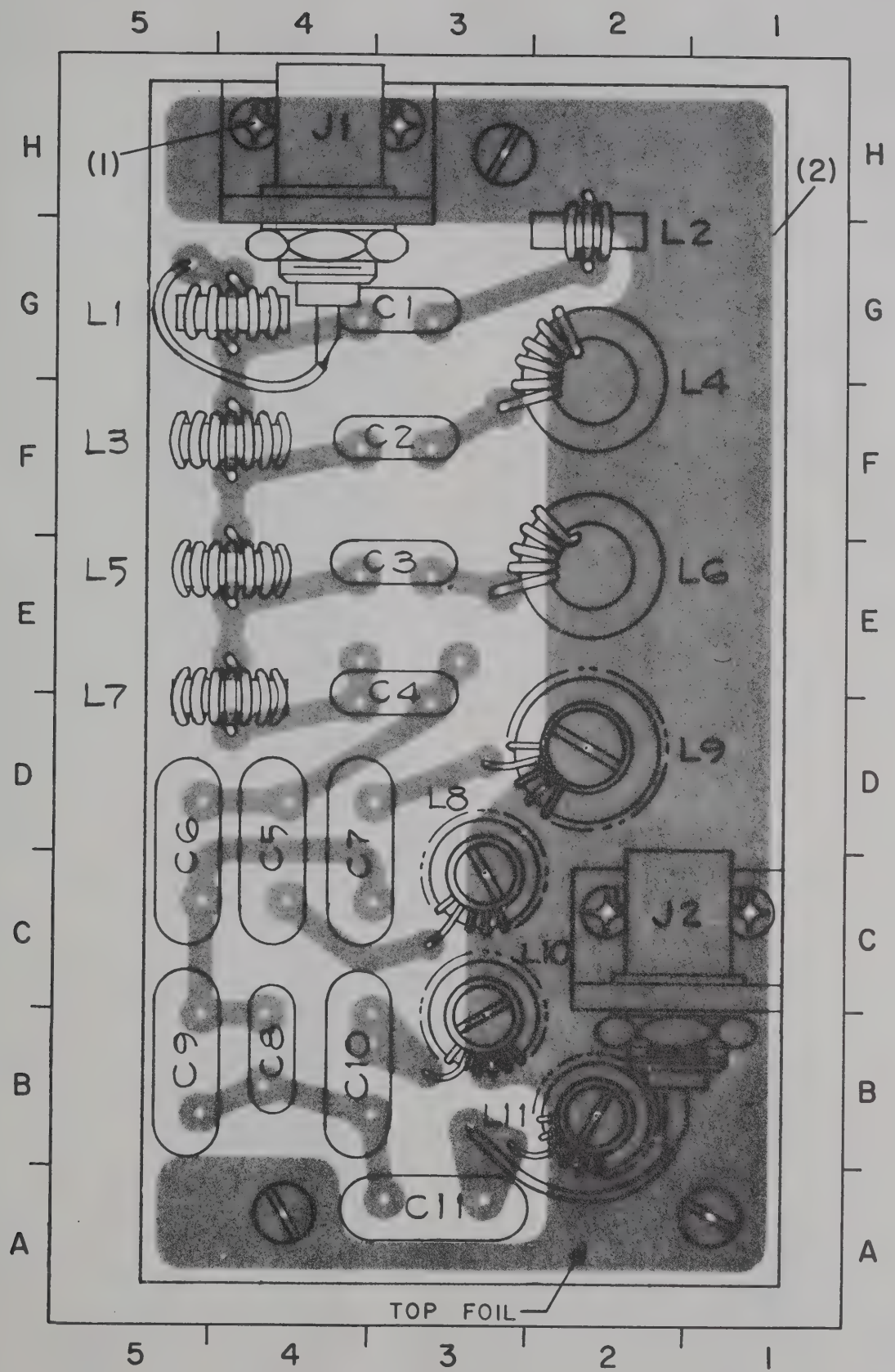


Figure 7-2. RF Filter 1A1, 34-0121, Parts Location (Top View) (Sheet 1 of 2)

NOTES FOR FIGURE 7-2 (Sheet 2 of 2)

PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A1C1	3F	1A1C9	2C	1A1L4	5F
1A1C2	3F	1A1C10	3B	1A1L5	1E
1A1C3	3F	1A1C11	4A	1A1L6	6D
1A1C4	3D	1A1J1	3H	1A1L7	1D
1A1C5	3C	1A1J2	5C	1A1L8	4D
1A1C6	2C	1A1L1	1G	1A1L9	5D
1A1C7	3C	1A1L2	5E	1A1L10	4C
1A1C8	3B	1A1L3	1F	1A1L11	4B

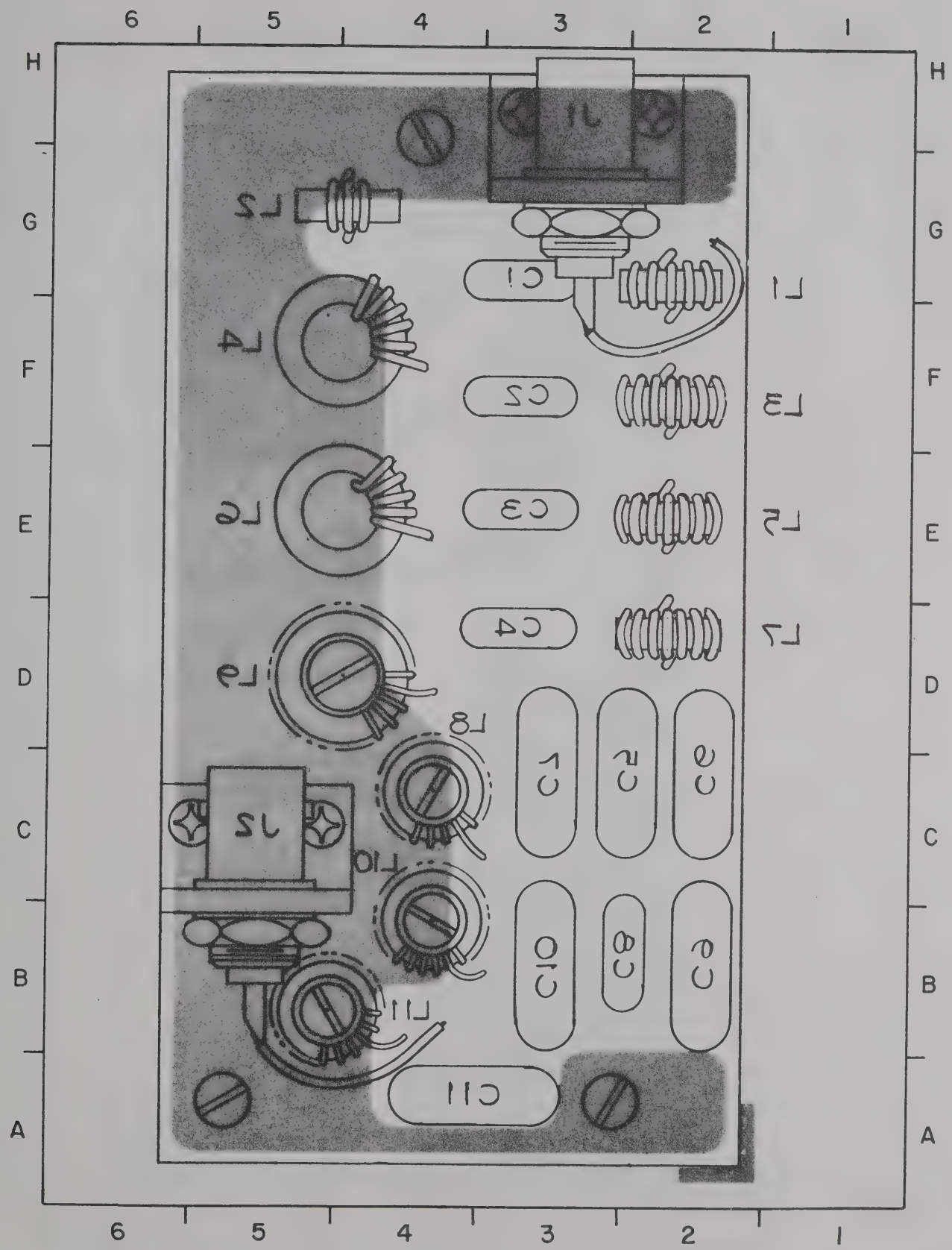


Figure 7-2. RF Filter 1A1, 34-0121, Parts Location (Bottom View) (Sheet 2 of 2)

NOTES FOR FIGURE 7-3 (Sheet 1 of 2)

PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A1C1	4G	1A1C9	5C	1A1L4	1G
1A1C2	4F	1A1C10	4A	1A1L5	5E
1A1C3	3E	1A1C11*		1A1L6*	
1A1C4	3E	1A1J1	4H	1A1L7*	
1A1C5	4C	1A1J2	1C	1A1L8	3D
1A1C6	5D	1A1L1	5G	1A1L9	2D
1A1C7	4C	1A1L2	1H	1A1L10*	
1A1C8*		1A1L3	5F	1A1L11	3B

*Not Used

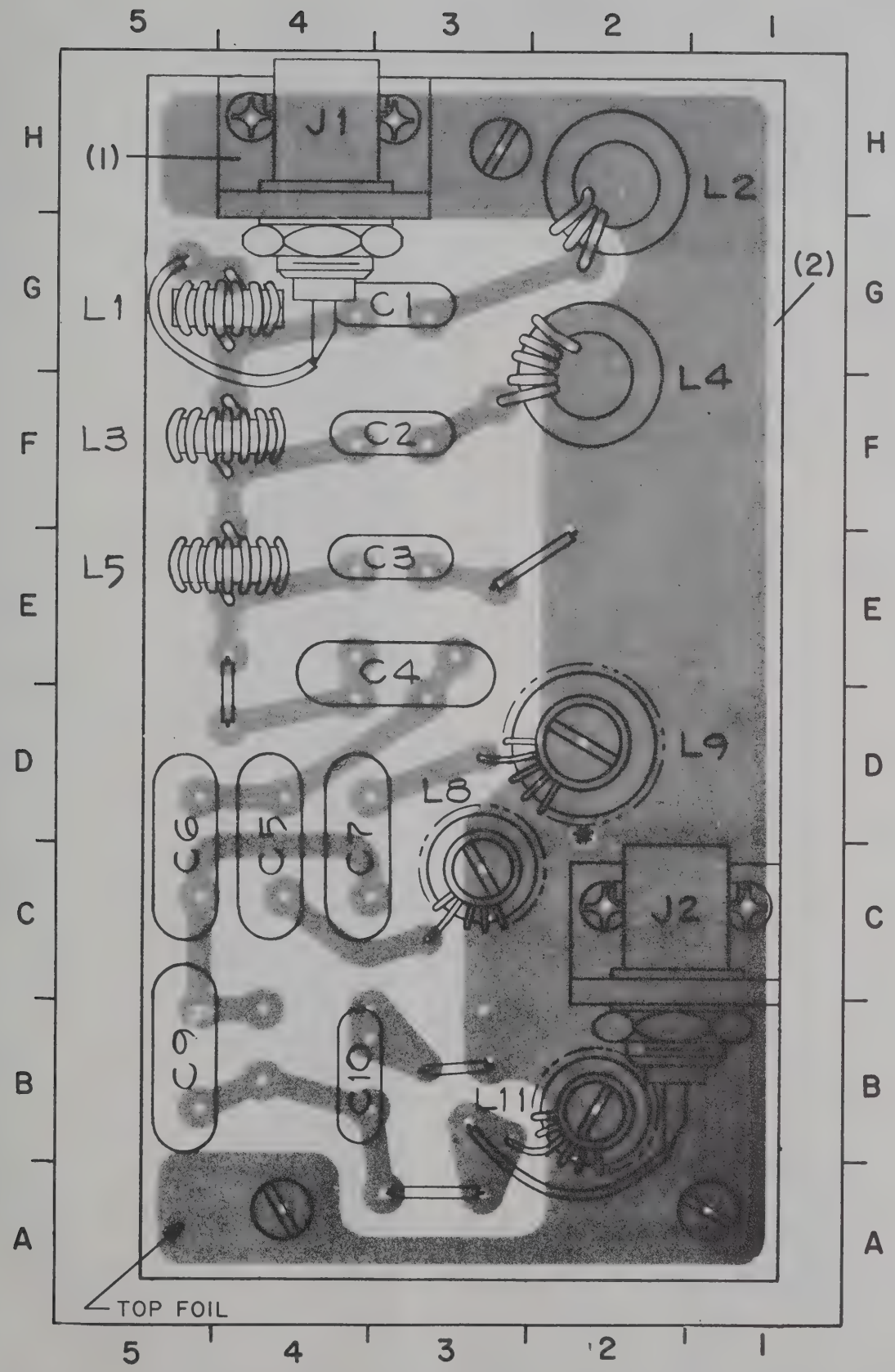


Figure 7-3. RF Filter, 1A1, 34-0122, Parts Location (Top View) (Sheet 1 of 2)

NOTES FOR FIGURE 7-3 (Sheet 2 of 2)

PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A1C1	3G	1A1C9	2B	1A1L4	5F
1A1C2	3F	1A1C10	3B	1A1L5	5E
1A1C3	3E	1A1C11*		1A1L6*	
1A1C4	3D	1A1J1	3H	1A1L7*	
1A1C5	2C	1A1J2	5C	1A1L8	4D
1A1C6	2C	1A1L1	1G	1A1L9	5D
1A1C7	3C	1A1L2	5H	1A1L10*	
1A1C8*		1A1L3	1F	1A1L11	4B

*Not Used

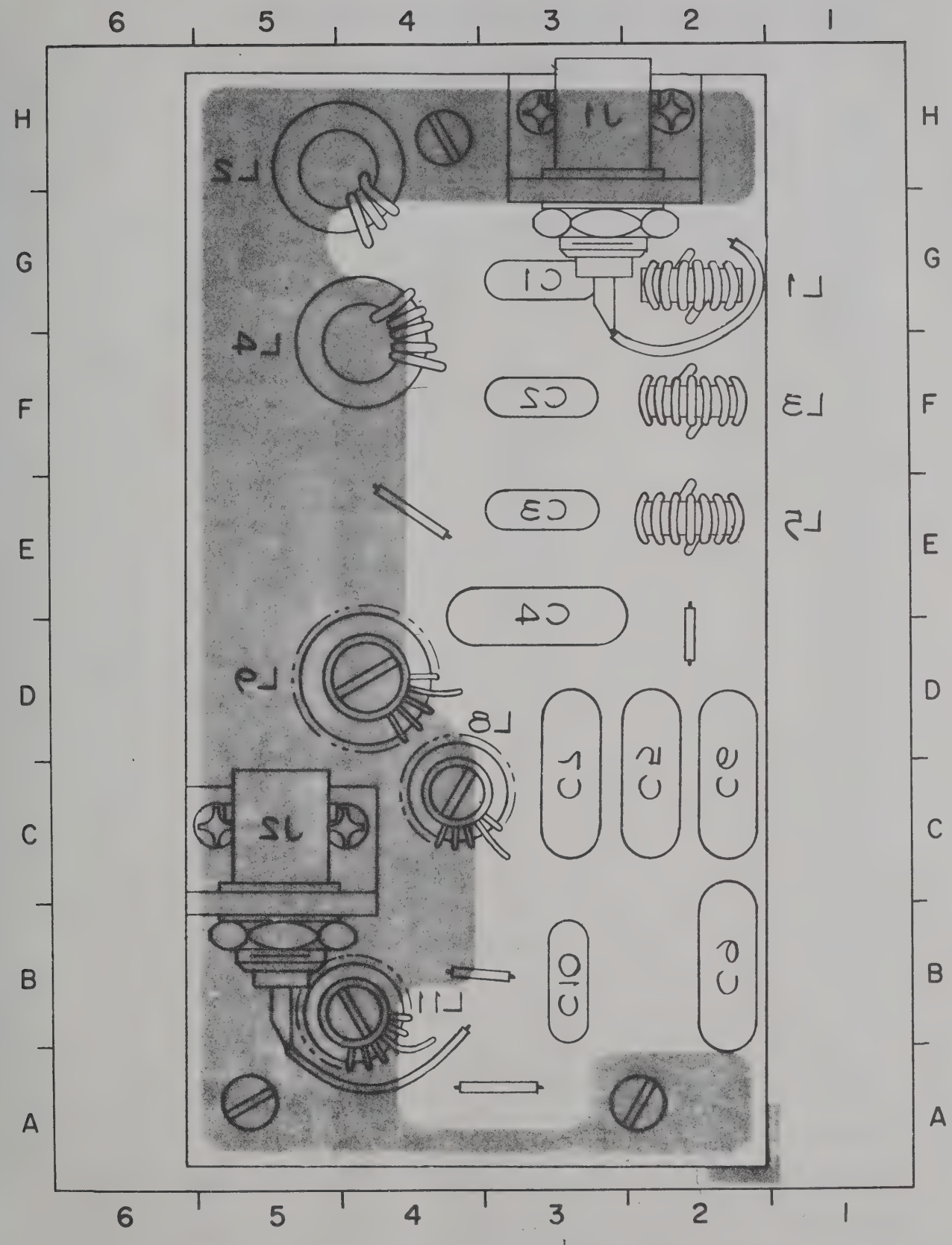


Figure 7-3. RF Filter, 1A1, 34-0122, Parts Location (Botton View) (Sheet 2 of 2)

NOTES FOR FIGURE 7-4 (Sheet 1 of 2)

PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A2C1		1A2C25		1A2J7	
1A2C2		1A2C26		1A2J8	
1A2C3		1A2C27		1A2J9	
1A2C4		1A2C28		1A2J10	
1A2C5		1A2C29		1A2K1	
1A2C6		1A2C30		1A2L1	
1A2C7		1A2C31		1A2L2	
1A2C8		1A2C32		1A2L3	
1A2C9		1A2C33		1A2L4	
1A2C10		1A2C34		1A2L5	
1A2C11		1A2C35		1A2L6	
1A2C12		1A2C36		1A2L7	
1A2C13		1A2C37		1A2L8	
1A2C14		1A2C38		1A2L9	
1A2C15		1A2C39		1A2Q1	
1A2C16		1A2CR1		1A2Q2	
1A2C17*		1A2CR2		1A2Q3	
1A2C18		1A2CR3		1A2Q4	
1A2C19*		1A2J1		1A2Q5	
1A2C20		1A2J2		1A2Q6	
1A2C21*		1A2J3		1A2Q7	
1A2C22		1A2J4		1A2Q8	
1A2C23*		1A2J5		1A2Q9	
1A2C24		1A2J6		1A2Q10	

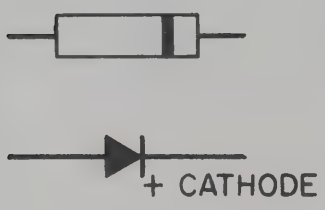
NOTES FOR FIGURE 7-4 (Sheet 1 of 2 continued)

PARTS LOCATION INDEX

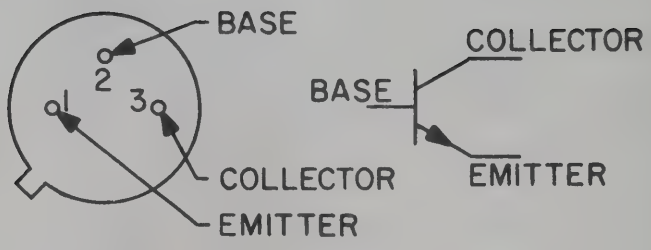
REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A2Q11	6C	1A2R16	3C	1A2R32	4C
1A2R1	5A	1A2R17	3C	1A2R33	6C
1A2R2	5A	1A2R18	4B	1A2R34	2E
1A2R3	3A	1A2R19	4B	1A2R35	3E
1A2R4	4B	1A2R20	5B	1A2R36	4E
1A2R5	2B	1A2R21	6B	1A2R37	5E
1A2R6	1B	1A2R22	1D	1A2T1	4A
1A2R7	1A	1A2R23	2D	1A2T2	2D
1A2R8	1B	1A2R24	3C	1A2T3	1D
1A2R9	2B	1A2R25	4C	1A2T4	3D
1A2R10	2B	1A2R26	4C	1A2T5	2D
1A2R11	2B	1A2R27	4C	1A2T6	4D
1A2R12	4B	1A2R28	5C	1A2T7	4D
1A2R13	4A	1A2R29	6D	1A2T8	5D
1A2R14	1B	1A2R30	1C	1A2T9	6D
1A2R15	4B	1A2R31	3B		

* Used only on CU-1382G/FRR

NOTES FOR FIGURE 7-4 (Cont)

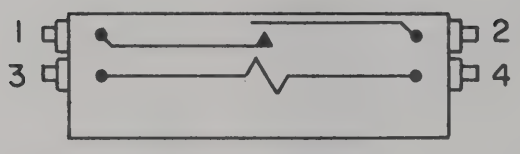


1A2CR1 - CR3



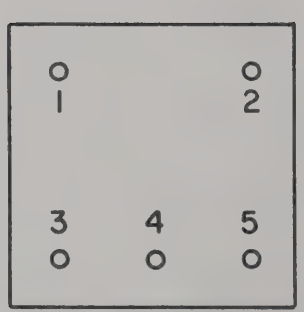
(BOTTOM VIEW)

1A2Q1 - Q11

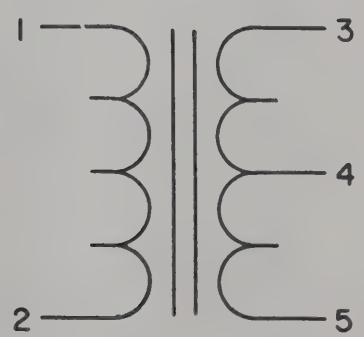


(TOP VIEW)

1A2K1



(BOTTOM VIEW)



1A2T1-T9

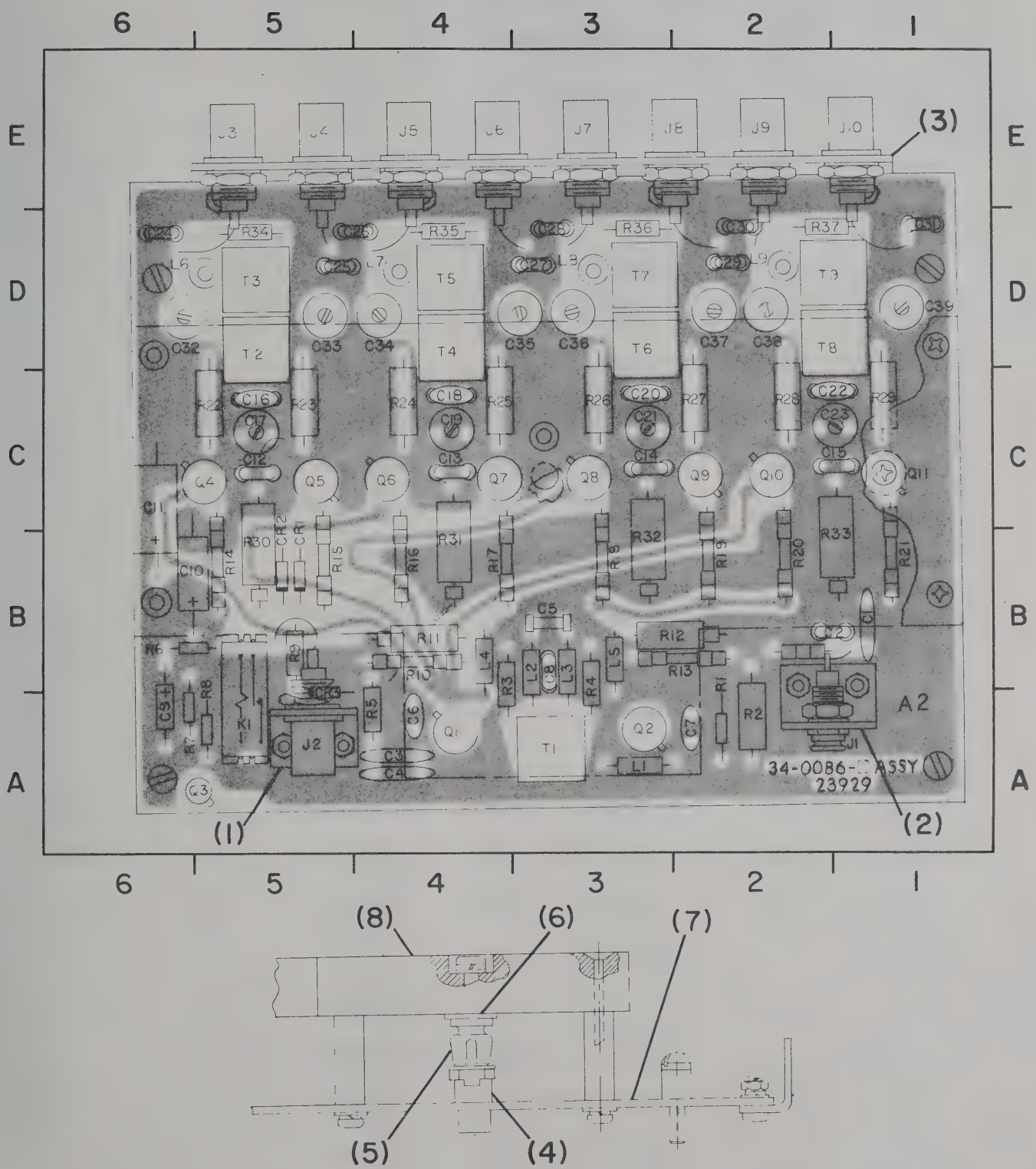


Figure 7-4. Divider Assembly, 1A2, Parts Location (Top View) (Sheet 1 of 2)

NOTES FOR FIGURE 7-4 (Sheet 1 of 2)

PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A2C1	1B	1A2C25	5D	1A2J7	3E
1A2C2	1B	1A2C26	5D	1A2J8	3E
1A2C3	4A	1A2C27	3D	1A2J9	2E
1A2C4	4A	1A2C28	3D	1A2J10	1E
1A2C5	3B	1A2C29	2D	1A2K1	5A
1A2C6	4A	1A2C30	2D	1A2L1	3A
1A2C7	2A	1A2C31	1D	1A2L2	3A
1A2C8	3A	1A2C32	6D	1A2L3	3A
1A2C9	6A	1A2C33	5D	1A2L4	4B
1A2C10	5B	1A2C34	4D	1A2L5	3B
1A2C11	6C	1A2C35	4D	1A2L6	6D
1A2C12	5C	1A2C36	3D	1A2L7	4D
1A2C13	4C	1A2C37	2D	1A2L8	3D
1A2C14	3C	1A2C38	2D	1A2L9	2D
1A2C15	2C	1A2C39	1D	1A2Q1	4A
1A2C16	5C	1A2CR1	5B	1A2Q2	3A
1A2C17*		1A2CR2	5B	1A2Q3	6A
1A2C18	4C	1A2CR3	5A	1A2Q4	6C
1A2C19*		1A2J1	1A	1A2Q5	5C
1A2C20	3C	1A2J2	5A	1A2Q6	4C
1A2C21*		1A2J3	5E	1A2Q7	4C
1A2C22	2B	1A2J4	5E	1A2Q8	3C
1A2C23*		1A2J5	4E	1A2Q9	3C
1A2C24	6D	1A2J6	4E	1A2Q10	2C

NOTES FOR FIGURE 7-4 (Sheet 2 of 2 Continued)

PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A2Q11	1C	1A2R16	4B	1A2R32	3B
1A2R1	2A	1A2R17	4B	1A2R33	2B
1A2R2	2A	1A2R18	3B	1A2R34	5D
1A2R3	4A	1A2R19	2B	1A2R35	4D
1A2R4	3A	1A2R20	2B	1A2R36	3D
1A2R5	4A	1A2R21	1B	1A2R37	2D
1A2R6	6B	1A2R22	5C	1A2T1	3A
1A2R7	6A	1A2R23	5C	1A2T2	5D
1A2R8	5A	1A2R24	4C	1A2T3	5D
1A2R9	5B	1A2R25	4C	1A2T4	4D
1A2R10	4B	1A2R26	3C	1A2T5	4D
1A2R11	4B	1A2R27	2C	1A2T6	3D
1A2R12	2B	1A2R28	2C	1A2T7	3D
1A2R13	2B	1A2R29	1C	1A2T8	1D
1A2R14	5B	1A2R30	5B	1A2T9	1D
1A2R15	5B	1A2R31	4B		

* Used only on CU-1382G/FRR

(BLANK)

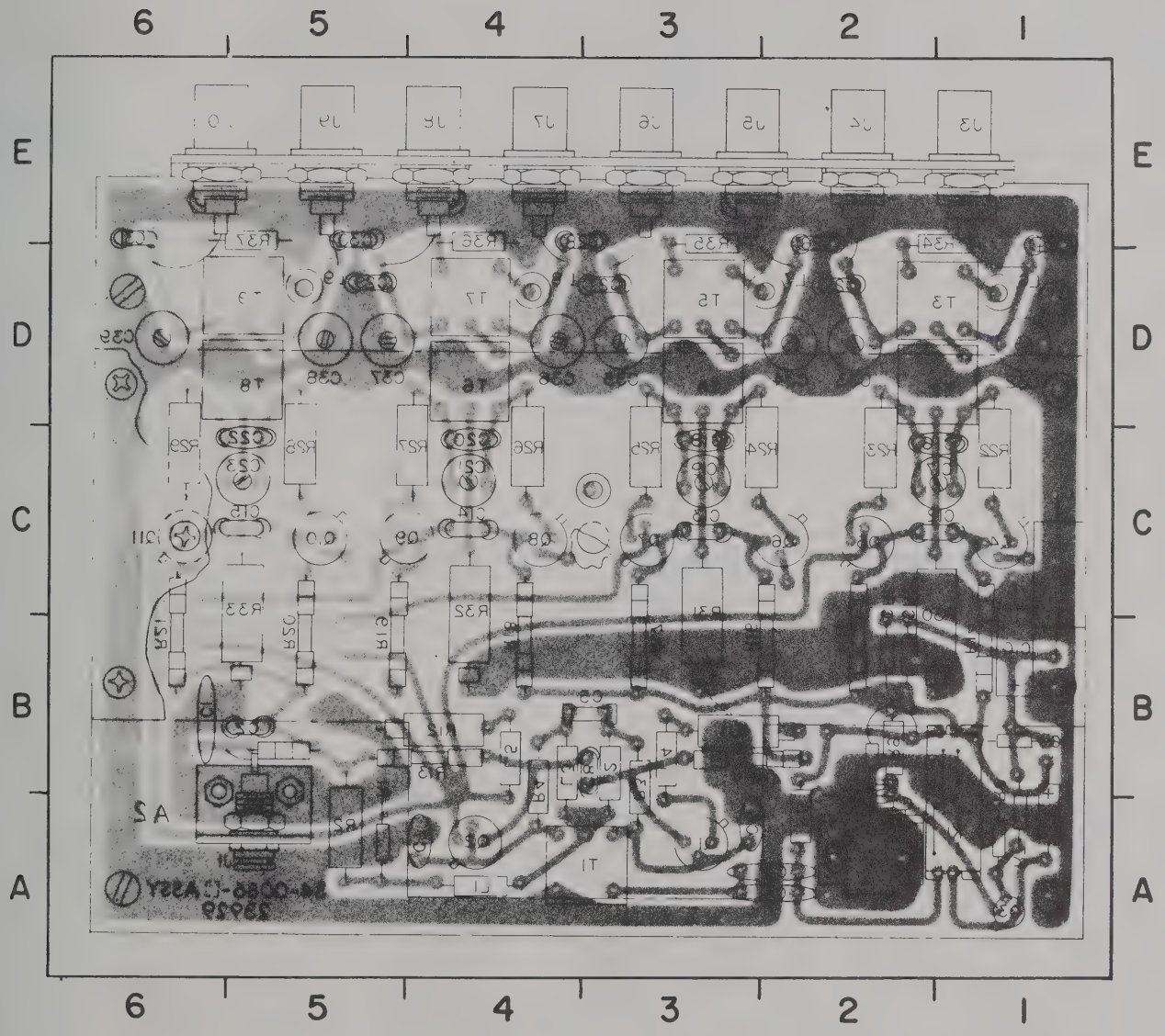
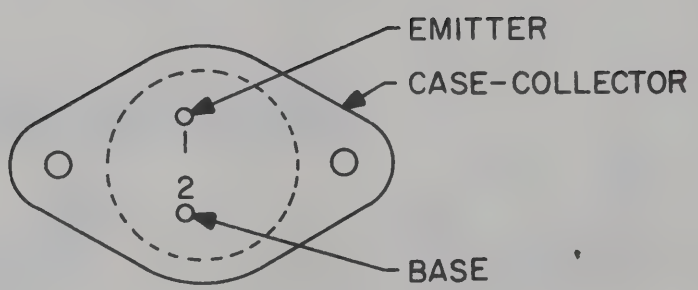


Figure 7-4. Divider Assembly, 1A2, Parts Location (Bottom View) (Sheet 2 of 2)

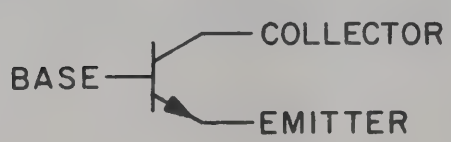
NOTES FOR FIGURE 7-5

PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A3A1	2B	1A3J1	5C	1A3T1	3G
1A3C1	2B	1A3Q1	5C		
1A3C2	2B	1A3Q2	$c		



(BOTTOM VIEW)



Q1 , Q2

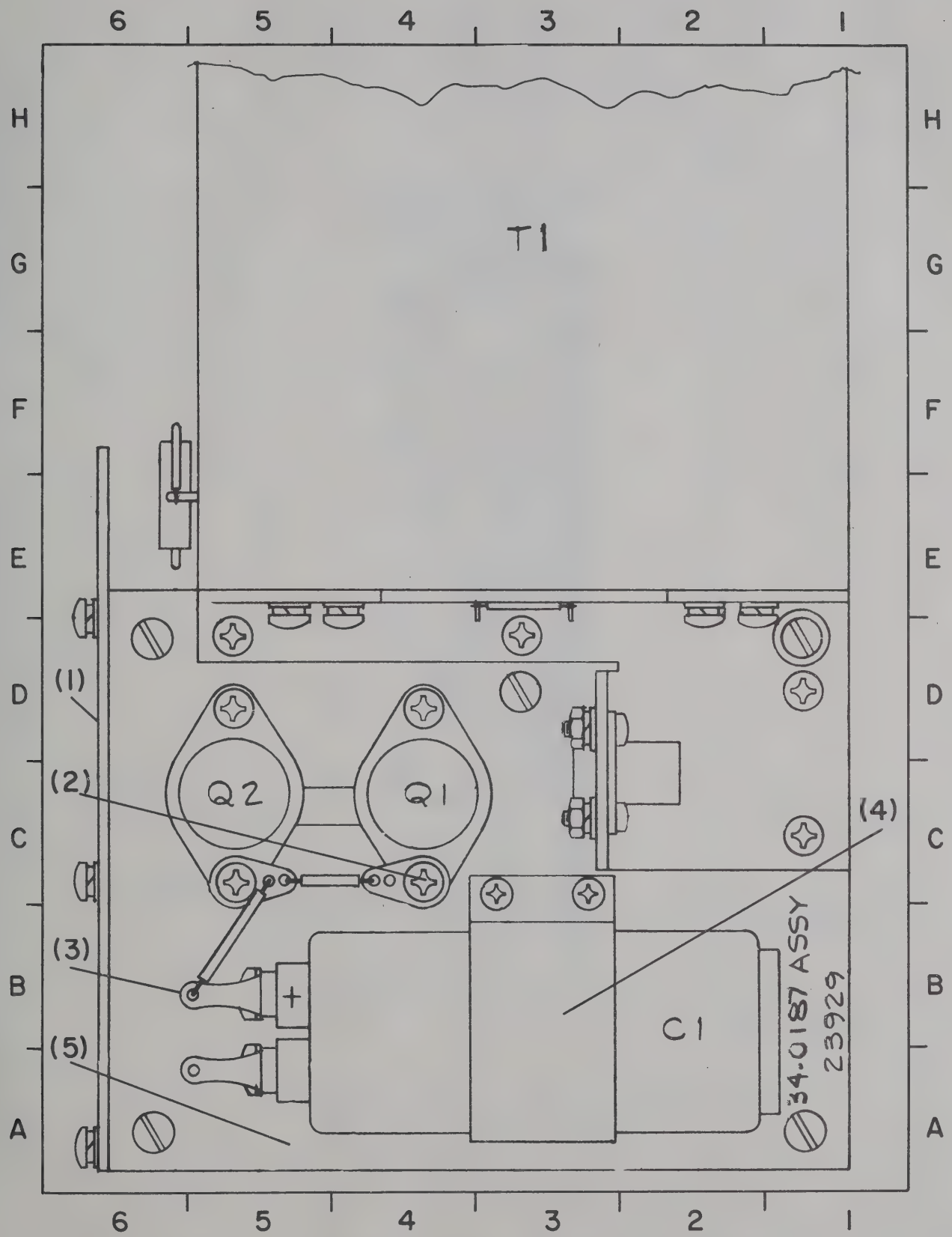
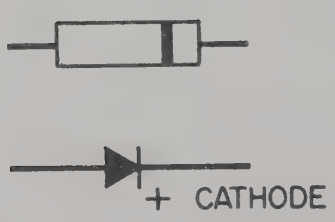


Figure 7-5. Power Supply, 1A3, Parts Location

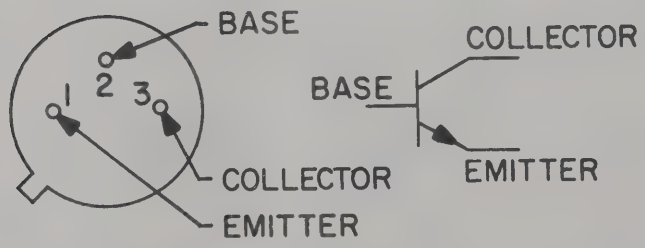
NOTES FOR FIGURE 7-6

PARTS LOCATION INDEX

REF DES	ZONE	REF DES	ZONE	REF DES	ZONE
1A3A1C1	1F	1A3A1CR7	2C	1A3A1R6	2D
1A3A1C2	2D	1A3A1Q1	2E	1A3A1R7	2B
1A3A1C3	2C	1A3A1Q2	2D	1A3A1R8	2B
1A3A1CR1	2F	1A3A1Q3	2D	1A3A1R9	2B
1A3A1CR2	2G	1A3A1R1	2F	1A3A1R10	2B
1A3A1CR3	2F	1A3A1R2	2E	1A3A1R11	2C
1A3A1CR4	2F	1A3A1R3	2F	1A3A1R12	3E
1A3A1CR5	2E	1A3A1R4	2E		
1A3A1CR6	2D	1A3A1R5	2E		



CR1 - CR7



(BOTTOM VIEW)

Q1 - Q3

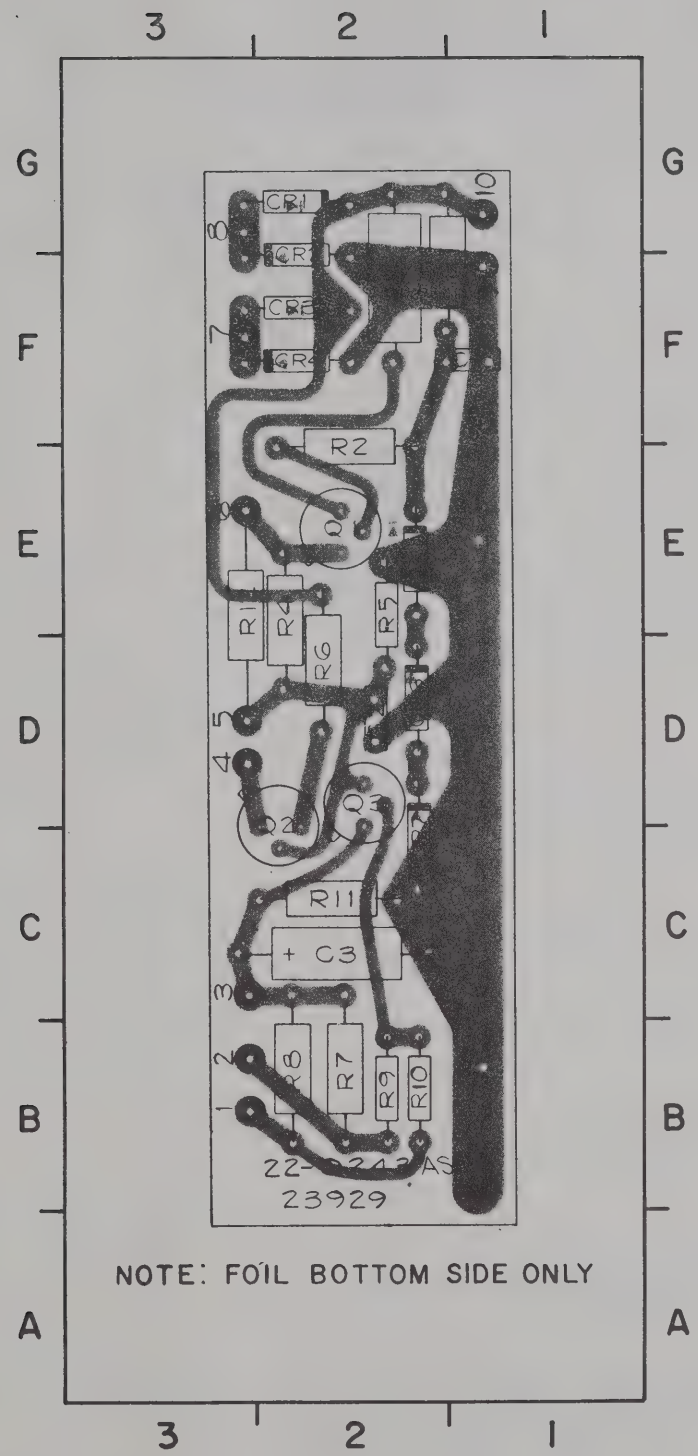


Figure 7-6. Regulator Assembly, 1A3A1, Parts Location

CHAPTER 8

INSTALLATION

8-1. INTRODUCTION.

8-2. This chapter provides the information necessary for the installation of the antenna coupler.

8-3. UNPACKING AND REPACKING.

8-4. Unpacking the receiver is accomplished by carefully removing it from its shipping container. Extreme caution should be used in unpacking to prevent damage to controls and connectors.

8-5. INSTALLATION PROCEDURES.

8-6. SITE SELECTION. In selecting an installation site, adequate consideration must be given to the space requirements. These requirements include space for cable bends and removal of antenna coupler, as well as considerations of proximity to associated equipment. See figure 8-1 for the dimensions of the antenna coupler.

8-7. CABLE ASSEMBLIES. Cable assemblies required for installation of the antenna coupler are described in table 8-1.

8-8. PRIMARY POWER CONNECTION. To connect primary power to the antenna coupler proceed as follows:

a. Connect 115 Vac power to AC connector 1J1 on rear of the antenna coupler.

b. Set front-panel POWER switch 1S1 to OFF.

8-9. POWER SUPPLY ADAPTATION. The antenna coupler is designed to operate from a nominal 115 Vac supply. The power input is connected to the 115 volt tap on the primary side of power transformer 1A3T1 in the antenna coupler when shipped. If the supply voltage is not 115 Vac, the input connection must be changed to the appropriate tap (see figure 5-10). To change the transformer tap connection, proceed as follows:

a. Set POWER switch 1A1 to OFF, and disconnect cables to connectors 1J1, 1J2, and 1A2J3 thru 1A2J10 on rear panel of antenna coupler.

b. Loosen front panel screws and slide antenna coupler out of rack.

c. Remove top cover and disconnect cable assembly at power supply 1A3J1.

d. Loosen five screws power supply 1A3 to antenna coupler and remove from chassis.

e. Rewire transformer 1A3T1 per table 8-2 and figure 8-2. Refer to figure 7-5 for location of transformer.

f. Replace power supply 1A3 in chassis, connect cable assembly to 1A3J1, and replace cover.

g. Replace antenna coupler in rack.

h. Reconnect cables that were disconnect in step a above.

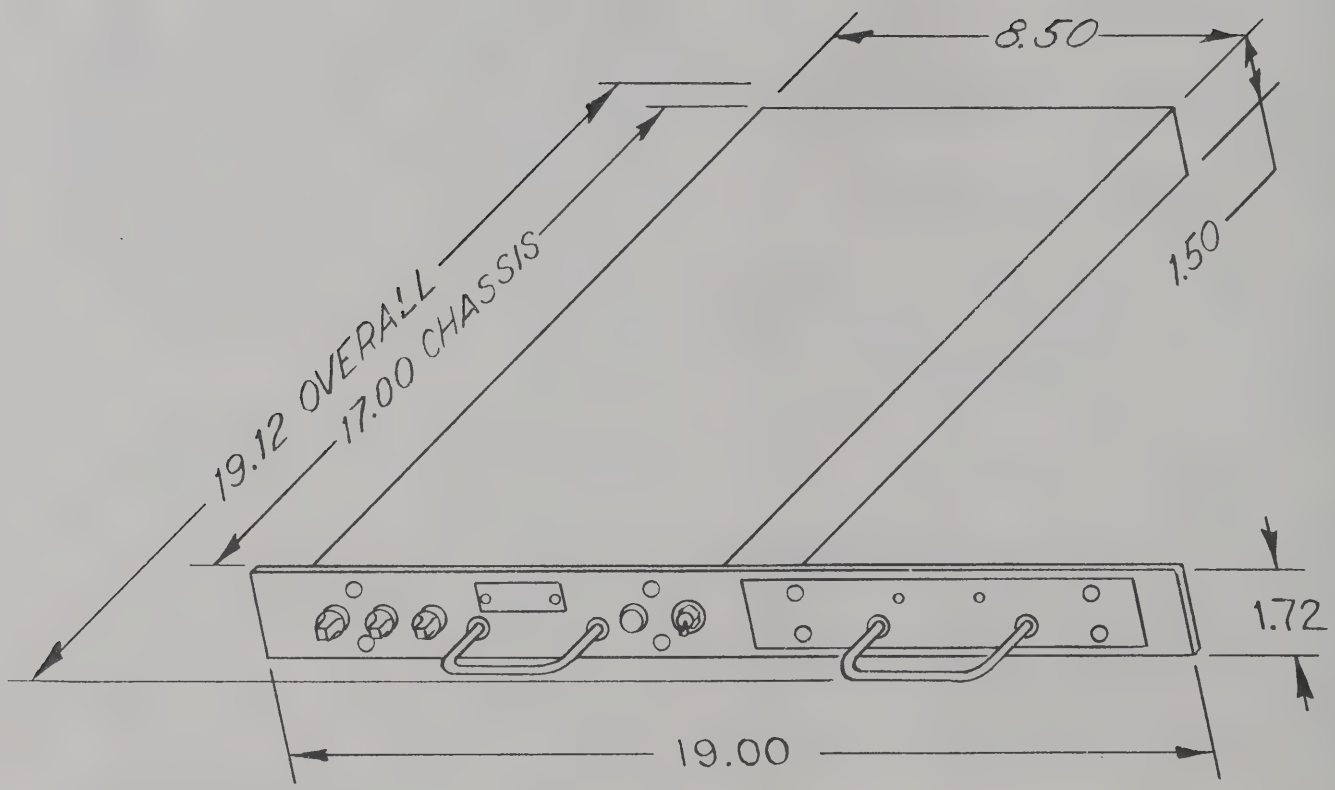
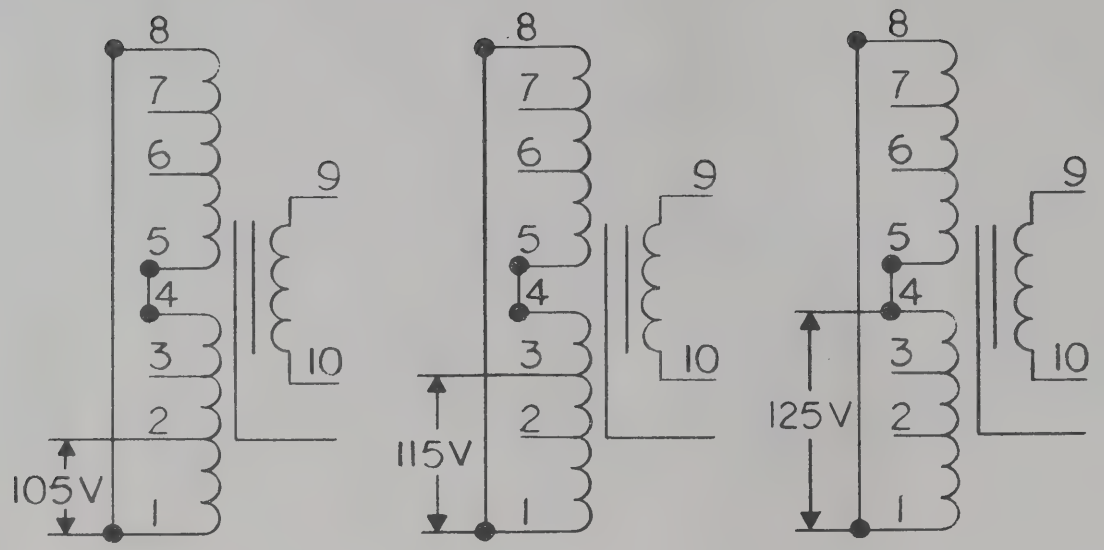


Figure 8-1. Antenna Coupler Outline Dimensions

Table 8-1. Antenna Coupler, Interconnecting Cable Assemblies

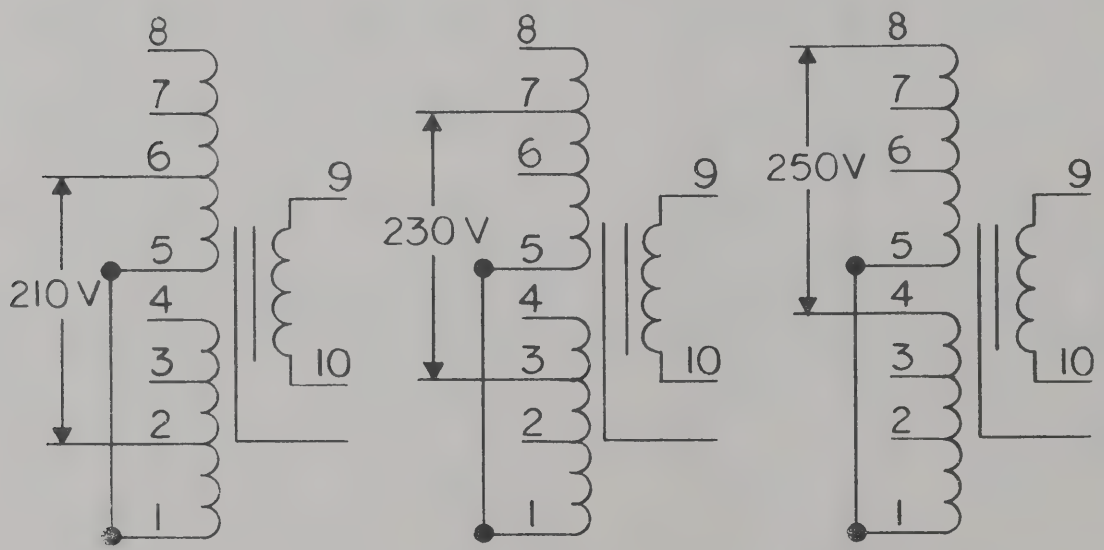
CABLE TYPE	NUMBER OF CABLE CONDUCTORS	FROM		TO
		CONNECTOR PART NO.	CONNECTOR REF. DES.	UNIT
17236S	3	MS3102A10SL-3P	1J1 (AC)	External primary power source
	Coaxial	UG-1094	1J2 (INPUT)	Antenna
	Coaxial	UG-1094	1A2J3 (8)	Receivers or Termination
	Coaxial	UG-1094	1A2J4 (7)	Receivers or Termination
	Coaxial	UG-1094	1A2J5 (6)	Receivers or Termination
	Coaxial	UG-1094	1A2J6 (5)	Receivers or Termination
	Coaxial	UG-1094	1A2J7 (4)	Receivers or Termination
	Coaxial	UG-1094	1A2J8 (3)	Receivers or Termination
	Coaxial	UG-1094	1A2J9 (2)	Receivers or Termination
	Coaxial	UG-1094	1A2J10 (1)	Receivers or Termination



105 VOLT CONNECTION

115 VOLT CONNECTION

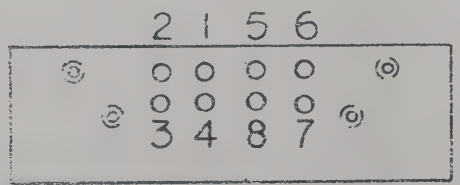
125 VOLT CONNECTION



210 VOLT CONNECTION

230 VOLT CONNECTION

250 VOLT CONNECTION



TRANSFORMER TERMINALS

NOTE: NORMAL FACTORY SETTING 115 VOLT CONFIGURATION

Figure 8-2. Transformer Connections

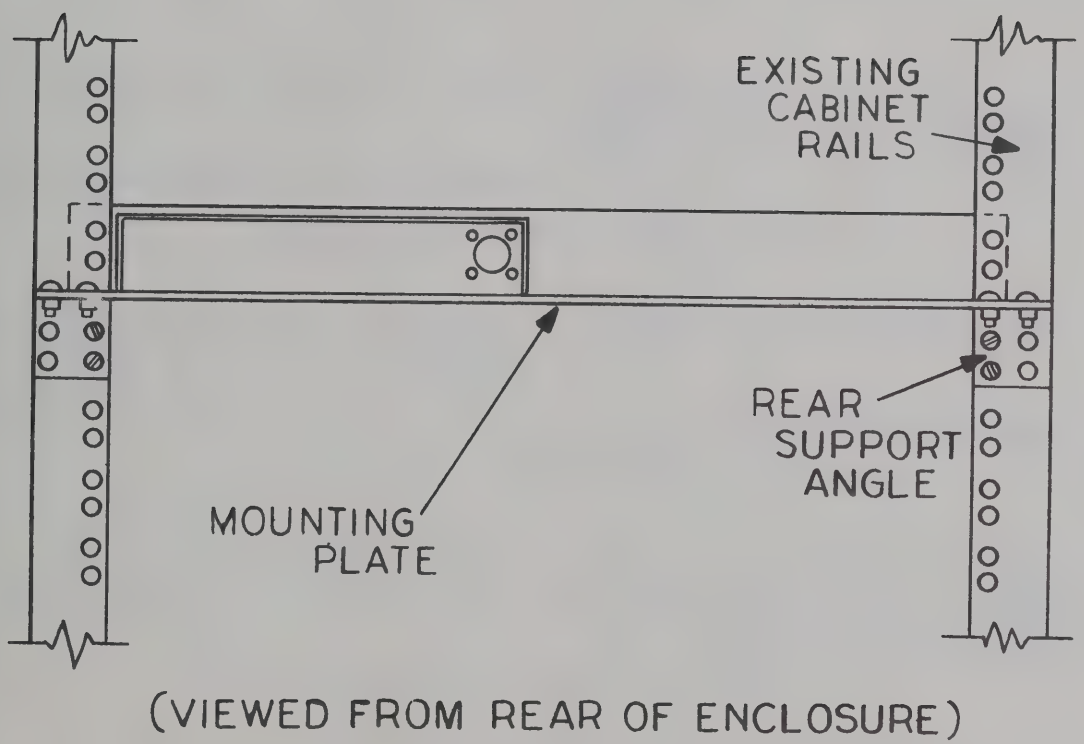


Figure 8-3. Mounting Plate and Rear Support Angles

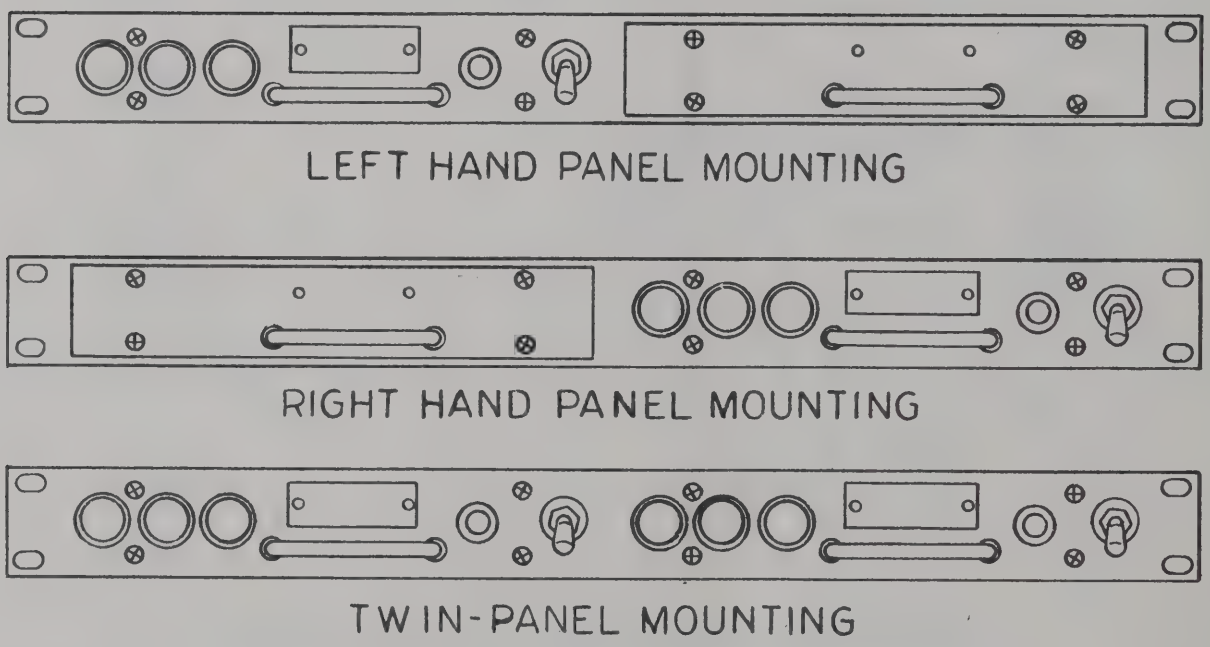


Figure 8-4. Antenna Couplers, Panel Mounting

8-10. MOUNTING. The antenna coupler may be installed in any convenient location at a shore communication facility in a 19-inch rack by means of a mounting plate and two rear support angles. For all required installation dimensions, see figure 8-1. Figure 8-3 illustrates the mounting plate and rear support angles used for mounting the antenna coupler in a standard rack.

8-11. As shown in figure 8-4, the antenna coupler units may be mounted in a variety of mounting configurations, namely: (1) Left-Hand Panel Mounting, (2) Right-Hand Panel Mounting, and (3) Twin Panel Mounting. After the mounting bracket has been installed, slide the antenna coupler into position and secure the front panel with 10-32 x 1/2 screws and washers. The antenna coupler is designed to operate in a maximum ambient air temperature range of -40°C to +50°C (-40°F to +112°F) with normal free convection cooling. If units mounted in an enclosed rack cabinent, forced convection cooling is mandatory. Ambient temperature at hot spots within the rack should be maintained at less than 50°C at all times.

8-12. INTERCONNECTION. All connections are made at the rear of the antenna coupler. Connect the antenna cable to INPUT jack J2 and receiver cables OUTPUT jack 1 thru 8, J3 thru J10. Connect power cable to ac jack J1 to primary power.

8-13. INSTALLATION CHECKOUT.

8-14. PHASE 1 - INSTALLATION INSPECTION AND PRE-ENERGIZING PROCEDURES. The antenna coupler should be carefully checked to indicators and switches, and for loose hardware and knobs. Make sure that all electronic assemblies are firmly seated. Check connectors for dirt, damage to pins, and broken insulators. Replace or repair as necessary. Check that all cables are properly connected and that all fuses are in place.

8-15. PHASE 2 - INITIAL TURN ON AND PRELIMINARY TEST. Turn on power at the POWER ON switch on the front panel. The indicator lamp should glow.

8-16. PHASE 3 - INSTALLATION VERIFICATION TEST. In order to verify proper installation of the antenna coupler, refer to the performance checks for the unit given in Chapter 4 of this manual.

8-17. INSTALLATION STANDARDS SUMMARY SHEET. This sheet is provided for the purpose of recording the results of all installation verification tests and is located at the end of this chapter. Each space is identified by the test and step numbers which provide the instructions for accomplishment.

Table 8-2. Transformer Taps

VOLTAGE AC	OPERATING VOLTAGE VAC	INTERCONNECT		APPLY PRIMARY POWER
105	94.5 to 115.5	1,8	5,4	1,2
115	103.5 to 126.5	1,8	5,4	1,3
125	112.5 to 137.5	1,8	5,4	1,4
210	189.0 to 231.0	1,5		2,6
230	207.0 to 253.0	1,5		3,7
250	225.0 to 273.0	1,5		4,8

ANTENNA COUPLER CU-1382F/FRR OR CU-1382G/FRR

INSTALLATION STANDARDS SUMMARY

Input Voltage_____Vac
Input Frequency_____Hz
(When reference standard tests are made)

Date_____
Serial No._____
Install in_____
(Station)

Record on this summary sheet the test indications which have been obtained during the installation verification tests in table 4-1.

Table	Test No.	Step	Output	Ref. Std.
4-1	S1	3	1_____	Check
		4	2_____	Check
			3_____	Check
			4_____	Check
			5_____	Check
			6_____	Check
			7_____	Check
			8_____	Check

APPENDIX A

WARRANTY

A-1. The contractor warrants that for a period of two (2) years after delivery and acceptance or for a period of six (6) months of operation after installation in the operational configuration and site, whichever is sooner, the supplies under this contract will be free from defects in material or workmanship and will conform to the requirements of this contract. Written notice of such defect or nonconformance shall be given by the Government to the Contractor not later than sixty (60) days following the end of the warranty period. If required by the Government within a reasonable time after such notice, the Contractor shall with all possible speed correct or replace the defective or nonconforming item or part thereof. When such correction or replacement requires transportation of the item or part, shipping costs, not exceeding usual charges, from the delivery point to the Contractor's plant and return, shall be borne by the Contractor; the Government shall bear all other shipping costs. This warranty shall then continue as to corrected or replacing supplies or, if only parts of such supplies are corrected or replaced, to such corrected or replacing parts, until one year after the date of redelivery, unless a different period of warranty is specified in the schedule. If the Government does not require correction or replacement of a defective or nonconforming item, the Contractor, if required by the contracting officer within a reasonable time after the notice of defect or nonconformance, shall repay such portion of the contract price of the item as is equitable in the circumstances.

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